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CATALOGUE OF THE GENUS FELIS

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CATALOGUE OF THE GENUS FELIS

BY

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PREFACE

Reginald Innes Pocock died in 1947 at the age of 84; a short biography and a list of his published works appeared in the "Obituary Notices of Fellows of the Royal Society", **6**, 1948, pp. 189–211. At the time of his death he was engaged on a systematic monograph of the Felidae, and the present volume, dealing with the genera *Felis* and *Otocolobus*, represents the portion that was in a sufficiently complete state for publication. Many changes would doubtless have been made in this portion had the whole monograph been completed, but the only posthumous alterations that have been made have been editorial. This work was carried out by Sir Norman Kinnear, C.B., and Mr. T. C. S. Morrison-Scott, D.S.C.

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INTRODUCTION

Amongst systematic zoologists there are still wide differences of opinion regarding the status to be assigned to the various groups into which the existing species of Felidae obviously fall. By Linnaeus and several of those that immediately followed him all the known forms were considered to be referable to a single genus, *Felis*, despite the manifest differences between such representatives of the group as the house-cat and the lion, for example, although Kerr as early as 1792 gave separate generic rank to the Lynx under that name. But in 1821 Gray began a series of publications, continued until 1874, in which he proposed a number of generic and subgeneric terms for various species, and his works overlapped, without quoting, a paper by Severtzow in 1858 in which generic names, without definitions, were accorded to most of the then described species. The result was considerable clashing and confusion in the nomenclature, and many unrelated species were affiliated and closely allied species generically separated.

In the circumstances it is perhaps not surprising that when writing his imposing *Monograph of the Felidae*, published in 1883, Elliot ignored Severtzow's paper and set aside Gray's genera and subgenera as not worth admission. He referred all the species to two genera, *Cynaelurus* for the Cheetah and *Felis* for the rest. In this easy, conservative method of dealing with them he followed Mivart and was followed by Lydekker, both of whom monographed the family on a smaller scale. Blanford and W. L. Sclater did the same in their treatment of the Felidae of British India and South Africa respectively. Others also adopted this classification.

As thus understood *Felis* is a heterogeneous, unwieldy assemblage, ranging practically all over the world, apart from Madagascar, some small islands and the Australian Region. Considering its wide distribution and exceedingly varied habitats, it would be strange if the family had not become differentiated into groups of generic status, like all the rest of the families of Carnivora that are extensively dispersed. Perhaps it was this conviction that induced Matschie in 1895 and Trouessart in 1904 to break up *Felis* as understood by Mivart, Elliot and their followers, and to employ the names introduced mainly by Severtzow and Gray for the genera or subgenera into which they thought it might be legitimately split. But their classifications were clearly open to criticism from the nominal standpoint and in some cases for the association of unrelated species and the allocation of closely allied forms to different genera. They were, nevertheless, efforts in the right direction.

The nomenclature and classification adopted in this volume are, with a few amplifications and emendations, the same as those proposed in a paper I published in 1917.

In two particulars the present volume differs from previous catalogues of the mammals in the national collection. The first is the inclusion of the

interesting and extensive material of the domesticated representatives of the family, and the second is the more detailed attention paid to individual skins and skulls. Although this method involves more lengthened treatment than is customary of the forms dealt with, it was held to be desirable as the only means of emphasising the extent of the individual variations in colour, shape of skull or teeth to which species or local races are liable. Realisation of this is particularly called for in view of the prevalent tendency to regard as deserving of nominal distinction perhaps single specimens differing from one another in trivial characters if inhabiting different localities.

The ciphers preceding or following the citation of a specimen in this catalogue are the symbols by which it is entered in the British Museum registers. The original method of registration was a simple number, followed by a letter —e.g. 127g. This was replaced by a more complicated method involving four figures, indicating the date of arrival and the number of the specimen in a consignment. For instance, 79.9.25.82 means that the specimen was the eighty-second of a collection received on 25 September 1879. This system was practised for over a century, but in 1939 was abolished in favour of a simpler one in which the specimens were consecutively numbered as received throughout the year, e.g. 42.33 indicates that the specimen was the thirty-third entered in 1942. For the mounted specimens of domesticated animals a new register was established early in this century, the Cats being entered as C 1, etc.

Order CARNIVORA

EXISTING Carnivora are divisible into two suborders, the ARCTOIDEA and AELUROIDEA, distinguished as follows:

a. In the nasal chamber the ethmo-turbinals are comparatively short and excluded from the anterior portion of the chamber by the enlarged maxillo-turbinals which occupy the greater part of the space just within the anterior narial aperture; the auditory bulla is composed of a single tympanic bone ..... ARCTOIDEA

b. In the nasal chamber the ethmo-turbinals are comparatively long and extend to the anterior portion of the chamber, overlying the reduced maxillo-turbinals just within the orifice; the auditory bulla is composed of two bones, the ectotympanic and the entotympanic,[1] and is divided by a partition rising at the junction of these bones ..... AELUROIDEA

Suborder AELUROIDEA

Family FELIDAE

CHARACTERS.—The most highly specialised of Aeluroid Carnivora distinguished by the sum of a number of external, cranial and dental characters.

The penis is short with at most a small bone and the prepuce close to the scrotum. There are no specialised cutaneous glands either on the perinaeum or round the anus.

The limbs are digitigrade, with the feet hairy below, apart from the naked pads, the plantar pad forming a wide, compact indistinctly trilobate cushion; the claws are short, curved, pointed and retractile, their tips being raised from the ground and usually protected by lobes of skin constituting sheaths; the fore paw has five digits, but the first, or pollex, is small and set high above the rest, and there is only a single small subconical carpal pad; the hind foot has four digits, the first or hallux being absent, and there is no trace of metatarsal pads above the plantar pad.

In the head the muzzle is broad and short with the nose not appreciably overlapping the chin; the ears are comparatively simple with a well-developed bursa, which has its anterior flap mesially notched, and a simple supratragus with a clavate thickening; the superciliary and mystacial vibrissae are well developed and the genal tufts are present, though often difficult to find in the hairs of the cheeks; but the interramal tuft is absent.

In the suppression of the interramal tuft of vibrissae the Felidae are unique in the Aeluroidea. In the structure of the genitalia and the entire absence of specialised cutaneous glands associated with them and with the anus they

[1] In the primitive tropical African genus *Nandinia* the entotympanic remains cartilaginous throughout life and is frequently missing from prepared skulls.

resemble the Prionodontinae, a subfamily of the Viverridae. The feet in the latter are also similar in their general hairiness below and their retractile claws protected by cutaneous sheaths; but in the fore foot the pollex is not set so high, the plantar pad is composed of four sharply differentiated lobes and the carpal pad is bilobed, all more primitive features: the hind foot is similarly more primitive in retaining the first digit, or hallux, and its four-lobed plantar pad.

The skull and teeth have several peculiarities. The skull differs from that of other families of Aeluroidea in the situation of the posterior palatine foramina on the maxillo-palatine suture, not in front of it on the maxillae. In general form it is short as compared with its width, especially in the muzzle; the auditory bullae are typically high and rounded, only occasionally marked with a well-defined groove indicating the division between the two chambers, and there is no alisphenoid canal.

The teeth are reduced in number and highly specialised for predatory and sectorial purposes. The dental formula is: *i.* $\frac{3}{3}$; *c.* $\frac{1}{1}$; *pm.* $\frac{3 \text{ or } 2}{2}$; *m.* $\frac{1}{1}$. The incisors above and below form a straight, transverse line; the canines are pointed, grooved, and have the posterior border somewhat compressed; the morphological first upper premolar is absent and the second is sometimes absent and, when retained, almost always small, conical, single-rooted, and practically functionless; the third is moderately large, has a triangular, compressed crown with a single large pointed cusp and smaller cusps behind and in front at its base; the fourth upper premolar, the upper "carnassial", is much larger than the third and its crown is also compressed and carries three cusps set in a line, the first small and conical, the second (paracone) high and pointed, the third (metacone) lower and more blade-like; usually, also, it has a well-developed cusped lobe (protocone) projecting inwards from its anterior portion: the only upper molar retained is very small, transversely set and practically functionless. In the lower jaw the morphological first and second premolars are absent; the third and fourth closely resemble the third of the upper jaw; the crown of the single lower molar, the "lower carnassial", is composed of two compressed blade-like cusps, the paraconid and protoconid, which form a cutting shears with the paracone and metacone of the upper carnassial; but there is no trace of the cusp called the metaconid which in more primitive forms rises on the side of the protoconid, and the "heel" of this tooth, which is large in primitive Aeluroids, is at most represented by a small tubercle. The great reduction in size of the "heel" makes this tooth smaller than the upper carnassial, an unusual feature in the Carnivora.

Owing to the total suppression or reduction in size of the first two premolars above and below there is almost always a considerable postcanine space between the jaws, which is accentuated by the upcurvature of the anterior part of the mandible carrying the incisors and canines. The function of this is to give deep penetration to the canine teeth in killing prey. The space varies in dimensions in different species, and is most manifest in the Clouded Leopard (*Neofelis*). In the Hunting Leopard (*Acinonyx*), which does not seize its prey with its mouth, the space, on the contrary, does not exist when the jaws are closed.

In the typical Viverridae, a more primitive family of Aeluroidea than the Felidae, the dental formula is: *i.* $\frac{3}{3}$; *c.* $\frac{1}{1}$; *pm.* $\frac{4}{4}$; *m.* $\frac{2}{2}$. The upper carnassial (*pm.*^{4}) has the inner lobe (protocone) much less reduced in size, the first molar is a comparatively large functionally crushing tooth, nearly as large as *pm.*^{4}, and the lower carnassial ($m._1$) retains the posterior inner cusp (metaconid) and the large cuspidate heel. But in the Prionodontinae, the most specialised subfamily of the Viverridae, the dentition shows an approach to that of the Felidae in some respects. The formula is: *i.* $\frac{3}{3}$; *c.* $\frac{1}{1}$; *pm.* $\frac{4}{4}$; *m.* $\frac{1}{2}$. As in the Felidae, the upper carnassial (*pm.*^{4}) has the protocone reduced, the first upper molar small and transverse and the second suppressed; the lower carnassial, while retaining the metaconid, has the heel very considerably reduced, although not to the same extent as in the Felidae. Of all the Aeluroid Carnivora *Prionodon* clearly shows the greatest number of resemblances to the Felidae in its genitalia, feet and teeth. The combination suggests that these resemblances have genetic significance.

Remarks.—Quite recently G. M. Allen (*Bull. Mus. Comp. Zool.*, 83, p. 232, 1939) and recently Harper (*Extinct and Vanishing Mammals of the Old World*, p. 254, 1945) revived the heresy, upheld by W. K. Gregory, that the Mascarene Aeluroid *Cryptoprocta* belongs to the Felidae, Allen giving it subfamily rank in that family.[1] No one knowing *Cryptoprocta* as a living animal could mistake it for a cat: and in all the external characters used for the classification of the Aeluroidea, it most emphatically resembles primitive arboreal Viverridae or has special characteristics of its own. Its low head with the long muzzle, peculiar rhinarium, interramal tuft of vibrissae, are Viverrine, not Feline, characters, and its semi-plantigrade feet, naked below and primitively padded, are Paradoxurine. Moreover, the anus is sunk in a cutaneous sac as in the Hyaenas and Mongooses and the prepuce of the very long penis is abdominal and remote from the scrotum, as in Hyaena and *Paradoxurus*; but the penis is unique in the Aeluroidea for its large baculum. All these features were described and illustrated in my paper (*Ann. Mag. Nat. Hist.* (8), 17, p. 413, 1916). The head, feet, anus, and genitalia are so entirely different from those of the Cats that there is, in my opinion, no doubt that the approach to the feline dentition shown by *Cryptoprocta* is purely adaptive, as it is adaptive in Hyaenas and Weasels.

The classification here adopted for the existing Felidae is the one I proposed in 1917 (*Ann. Mag. Nat. Hist.* (8), 20, p. 332). The numerous genera are divisible into three subfamilies, of which the distinguishing characters may be briefly stated as follows:

a. The hyoidean apparatus modified by the conversion of the median portion of the suspender (*suspensorium*) into a long elastic tendon giving considerable mobility to the larynx; paws with complete cutaneous lobes protecting the claws when retracted ..... *Pantherinae*

[1] Mivart long ago pointed out its kinship with the Viverridae.

a[1]. The hyoidean apparatus of the normal mammalian type, the suspender composed of a series of bones jointed together restricting the mobility of the larynx .....

b. Paws with more or less well-developed cutaneous lobes forming sheaths for the retracted claws; larger or smaller post-canine space between the upper and lower jaws in front ..... *Felinae*

b[1]. Paws with the cutaneous claw-sheaths entirely suppressed; jaws with no postcanine space giving deep penetration to the canines *Acinonychinae*

The Acinonychinae contains the single genus and species *Acinonyx jubatus*, the Cheetah or Hunting Leopard. To the Pantherinae belong two genera and five species, *Panthera leo*, the Lion, *Panthera tigris*, the Tiger, *Panthera onca*, the Jaguar, *Panthera pardus*, the Leopard or Panther, and *Uncia uncia*, the Ounce or Snow Leopard. All the rest of the genera are assigned to the Felinae.[1]

Subfamily FELINAE

Genus FELIS, Linnaeus

1758. *Felis*, Linnaeus, Syst. Nat. 10th ed., I, p. 41 (Type *Felis catus*, Linnaeus, the blotched tabby domestic cat); Miller, Cat. Mamm. West. Europe, pp. 458–68, 1912; Pocock, Ann. Mag. Nat. Hist. (8), 20, p. 333, 1917 and Mamm. Brit. India, I, p. 285, 1939 (*sensu stricto*).

1843. *Chaus*, Gray, List Mamm. Brit. Mus., p. 45 (Type *Felis chaus*, Gray, entered as *lybica* by Gray).

1855. *Catus*, Fitzinger, Wiss.-pop. Naturgesch. der Säugeth., I, p. 265 (Type *Felis catus*, Linnaeus).

1858. *Catolynx*, Severtzow, Rev. Mag. Zool., Paris (2), 10, p. 385 (Type *Felis chaus*, Gray, restricted by Satunin, 1905).

1858. *Otailurus*, Severtzow, *op. cit.*, p. 388 (Type *Felis megalotis*, Müller, the feral striped domestic cat of Timor = *catus*).

1925. *Poliailurus*, Lönnberg, Arkiv. Zool., 18, No. 2, p. 119 (Type *Felis pallida* = *Felis bieti*).

1926. *Ercmaelurus*, Ognev, Ann. Mus. Zool. Leningrad, 27, p. 356 (Type *Eremaelurus thinobius*, Ognev = *F. margarita*).

1926. *Microfelis*, Roberts, Ann. Transvaal Mus., 2, p. 250 (Type *Felis nigripes*, Burchell).

[1] In the paper quoted above I commented on the failure to express with any approach to accuracy the kinship between many of the genera of Felidae embodied in the then comparatively recent classifications proposed by Matschie in 1895 and Trouessart in 1904. It would be needless to refer to this matter on the present occasion were it not that a quite recent classification of the African members of the family published by the late G. M. Allen (*Checklist of African Mammals*, 1939) displays surprising misapprehension on the same point. To begin with, as stated above, *Cryptoprocta* has no place in the Felidae, although he gives it the rank of a subfamily equivalent to the true Cats, which are comprehensively grouped as Felinae. In this subfamily three genera are admitted, namely *Acinonyx*, *Caracal*, and *Felis*, the last being subdivided into several subgenera, *Panthera*, *Felis*, etc.; and this association clearly implies that the kinship between the lion (*Panthera leo*) and the African Wild Cat (*Felis lybica*) is closer than the kinship between the latter and the Caracal, which is not the case.

Geographical Distribution.—The Old World: Europe and Asia south of about latitude 60 degrees north, in Asia eastward to Annam, absent from Malaya and the Sunda Islands; the whole of Africa, except the forested area.

Characters.—Small- or medium-sized Felidae with the jaws typically short as compared with the braincase; the ears narrowed towards the point, which is sometimes pencilled with a short tuft; the cheeks not fringed; the hairs of the nape sloping backwards, tolerably uniform on the body, tail and limbs, but sometimes developed into a spinal crest; the tail well developed, usually over half the length of the head and body, sometimes a little less; the paws narrow, with comparatively poorly developed claw-sheaths and only moderately extensive, emarginate, interdigital webs; the pupil contracts to a vertical slit under a strong light.

Colour.—The ground colour very variable according to the environment, brownish buff or grey, the distal portion of the contour hairs with those tints and the extreme tip darkened to a varying extent; some underwool always present even in tropical forms in summer; the soles of the feet black, this colour on the hind foot frequently extending up to the hock. The pattern of the body consists fundamentally of solid spots, not rosettes, which never coalesce into longitudinal stripes on the flanks, but may be represented by transverse vertical stripes, and always show at least a marked tendency to form vertical stripes behind the shoulder on each side. This pattern, when visible, is characteristic of the genus; but it may be faint or altogether suppressed in the adult. The crown and nape are typically marked with four or five longitudinal stripes sometimes extending on to the shoulders above, sometimes breaking up into spots on the head, but sometimes obsolete. On the sides of the head a stripe runs backwards from the corner of the eye and there are typically two below it on each cheek. The ear never has the conspicuous white spot so prevalent in many other members of the subfamily; this is at most represented by a reddish patch set off by black above and below; but the back of the ear may be uniformly coloured. The fore legs have at least one stripe, the brachial, below the elbow on the inner side and the hind legs are striped at least externally above the hocks. The tail may be banded above throughout and is always strongly striped in its distal half, and may have a black tip. The under side of the body is at least spotted in its median portion and the throat may have three transverse collars, the posterior being always retained though sometimes faint. The pattern above described on the limbs, tail, and usually on the under side persists even when that of the rest of the body is obliterated.

Skull.—The skull is wide and high as compared with its length; the orbit is large, typically with noticeably salient lower edge, and its posterior border, defined by the frontal and malar processes which sometimes meet, is at most a little in front of the middle of the skull. The frontal postorbital processes are broad, blunt and ligulate, a very characteristic feature. The upper profile of the skull seen from the side is convex, but the muzzle is typically more steeply sloped so that the nasal orifice is set lower in relation to the summit than in most of the other genera. The muscular moulding of the cranium is comparatively weak; the temporal ridges at most meeting on the summit and the sagittal

crest, when developed, is short and restricted to the posterior portion of the crown. The mesopterygoid fossa is wide, parallel-sided or wider in front, with a slightly biconcave anterior edge. The bulla is strongly inflated and its outer tympanic chamber is relatively large, sometimes about as extensive as the inner or entotympanic chamber, but usually a good deal smaller.

Felis catus[1] Linnaeus
The Domestic Cat

1758. *Felis catus*, Linnaeus, Syst. Nat., 10 ed., 1, p. 42 (Sweden); Pocock, Proc. Zool. Soc. 1907, p. 149, Pl. VIII; *id.* Mendel. Journ. 1911, p. 16; Miller, Cat. Mamm. West. Europe, p. 457, 1912 (*sensu stricto*).

1777. *Felis catus* (β) *domesticus* (Sweden), (δ) *hispanicus* (Spain), (ε) *caeruleus* (Europe and Siberia), Erxleben, Syst. Regni Anim., pp. 520–2.

1788. *Felis catus* (γ) *angorensis* (S) (Persia and Angora), *ruber* (Cape of Good Hope), Gmelin, Syst. Nat. 1, pp. 80, 81.

1792. *Felis catus sinensis* (China), *aureus* (New Spain), *madagascariensis* (Madagascar), Kerr, Anim. King., pp. 154, 155.

1800. *Felis catus longiceps* (New Spain), *striatus* Beehstein, Uebers. 4-füss. Thiere, 2, p. 678.

1826. *Felis torquata*, F. Cuvier, Hist. Nat. Mamm., Pl. 126 (Nepal).

1829. *Felis domestica vulgaris*, *antiquorum* (Abyssinia), *tralatitia* (Japan), *japonica* (Japan), *syriaca* (Syria), Fischer, Syn. Mamm., pp. 207, 208.

1836. *Felis pulchella* (Egypt) and *inconspicua* (Nepal), Gray, Mag. Nat. Hist., (N.S.) 1, p. 577 (Nepal).

1839. *Felis megalotis*, Müller, Verh. Nat. Ges. Nederl. Zool., p. 54 (Timor).

1844. *Felis cumana* (Venezuela or Trinidad) *brevicaudata* (Japan), Schinz, Syn. Mamm. I, pp. 452 and 455.

1846. *Felis huttoni*, Blyth, Journ. As. Soc. Beng., 15, p. 169 (Kandahar).

1883. *Felis bouvieri*, Rochebrune, Actes Soc. Linn. Bord. (4), 7, p. 126 (Cape Verde).

1904. *Felis libyca siamensis*, Trouessart, Cat. Mamm., Suppl., p. 273 (Siam).

1904. *Felis daemon*, Satunin, Proc. Zool. Soc., 1904, pt. 2, p. 162 (Elizabetpol, south of the Caucasus).

1906. *Felis ocreata agrius*, Bate, Proc. Zool. Soc., p. 317 (Crete).

[1] In 1930 Schwarz (*Zool. Anz.*, 91, p. 223) suggested extending the name *Felis catus* to embrace the two wild cats here regarded as distinct species, namely *F. silvestris* and *F. lybica*, as well as all domestic breeds. I have not adopted this view because, while admitting the obvious kinship between *F. silvestris* and *F. lybica*, I can find no evidence that they intergrade in a wild state. On the western countries of their range *F. lybica* of Morocco and Algeria is strikingly different from *F. silvestris* of Spain; in Asia *F. lybica* found in Palestine and Turkestan is equally distinct from *F. silvestris* of Asia Minor and the Caucasus, and so far as I am aware there is no reason to think that the two forms even hybridise in Italy, where both are alleged to occur. There are, moreover, obscurities connected with the origin of domestic cats. Those that exhibit the *torquata*-style of pattern are probably, but only probably, hybrids between *F. silvestris* and *F. lybica* and those with the unique *catus*-style of pattern are probably, but only probably, mutants of the other; and nothing approaching this peculiar pattern is ever seen in wild examples of the two forms. There is indeed less to be said in favour of applying the name *catus* as a specific term to these two kinds of wild cats than for calling the Wolf *Canis familiaris*.

Notes on Synonymy.—The names *Felis catus, domesticus, vulgaris* and *striatus* were given to domestic cats of the "blotched tabby" type with spiral pattern on the flanks; *hispanicus* to a "tortoise-shell" phase supposed to have come from Spain. *Felis caeruleus* is the name for a blue-grey phase from Europe and Siberia; *ruber*, a red phase from the Cape of Good Hope, and *sinensis*, a black and yellow phase with pendulous ears from China. Both the names *aureus* and *longiceps* were given to domestic cats of a reddish-yellow type with long heads and sharp snouts from New Spain and *cumana* to a specimen of the striped tabby type from Venezuela or Trinidad. *Felis madagascariensis* is the name for a domestic breed with twisted tail said to have come from Madagascar, but doubtless imported from Malaya, where the malformation is not uncommon. Both *Felis torquata* and *inconspicua* were given to feral cats of the transverse "striped tabby" type from Nepal; *obscura* stands for a blackish phase from South Africa, while *antiquorum* is the name for a grey-coloured animal from Abyssinia. *Felis tralatitia, japonica* and *brevicaudata* are names for Japanese cats, the first black and white or piebald, and the other two black and white animals with stunted tails. *Felis megalotis* and *huttoni* are names for feral "striped tabbies" from Timor and Khandahar, and *agrius* for a similarly coloured cat from Crete. *Felis siamensis* is a fawn and black cat from Siam, and *daemon*, a black feral cat obtained at Elizabetpol south of the Caucasus.

ORIGIN.—Probably a composite form of which the European representatives, at all events, owe their origin to the crossing of the two wild species described below as *Felis silvestris* and *Felis lybica.*

COLOUR.—The pattern, known as "tabby", is dimorphic. In the typical form, described by Linnaeus as *catus* and sometimes called the "blotched tabby", the body-pattern behind the shoulders consists of broad stripes which on the sides usually exhibit a looped or "spiral" arrangement and three dorsal stripes running to the root of the tail are usually distinguishable. In the second type, referred to as *torquata* and known as the "striped tabby", the pattern on the sides of the body behind the shoulders consists of narrower stripes transversely or vertically arranged, but commonly showing a tendency to break up into shorter stripes or spots posteriorly[1]; and the spinal area seldom has three well-marked black stripes, but is blackish with ill-defined edges and shows at most traces of spots or lines.

The two pattern-phases above described are individually variable to a certain extent; but one or the other can be detected in a majority of skins at all events of European domestic cats, although the stripes on the body may be entirely suppressed in the *torquata*-phase, which is less stable than the *catus*-phase.[2]

The prevalent ground colour of the upper side is clear, darkish grey due to black and white speckling of the contour hairs; but the pale area of these hairs may be pale buff or even pale brown, giving a generally darker tone to

[1] Of these two pattern-phases that of *torquata*, closely resembling the patterns of the two wild species cited above, is no doubt the original. The pattern of *catus* is unique in the family and its source is unknown. On the whole, it seems probable that it arose abruptly and fully developed as a mutant "freak" or "sport" from the other. The two cats freely interbreed and kittens with the two patterns commonly occur in the same litter; but the patterns always remain true to type and never blend. A similar case apparently of pattern dimorphism has occurred in the Rhodesian Cheetah (*Acinonyx jubatus jubatus*), which is normally covered with small, close-set solid spots. But comparatively recently in that country has appeared a cheetah, described as *Acinonyx rex*, in which the pattern consists of large black blotches and broad, longer or shorter stripes.

[2] Photographs of skins of cats from London, showing these variations, are reproduced on pls. viii and ix of my paper quoted above.

the pelage. Numbers of tame cats, moreover, are affected by melanism, erythrism, and albinism. The face, paws and chest are particularly liable to albinism; but this defect of pigment may occur in big patches elsewhere in combination with the normal grey tabby hue or with red or with black. Some skins are a mixture of the three colours; and a mixture of black and red, without white, gives rise to the true "tortoiseshell", 99 per cent of which are females.

A peculiar blend of black and white results in a diluted black or slate-grey tint commonly called "blue"; and wholly black or red cats are common, the latter being perhaps invariably males, the pattern, when retained, being deeper red than the ground colour; but in red cats of the *torquata*-type the body pattern may be altogether suppressed. Red with black stripes and white with dark brown stripes, like normal and semi-albino tigers respectively, are unknown varieties in domestic cats. In wholly white cats, which typically have blue eyes and are uncommon, the pattern can usually be detected under reflected light. So far as colour is concerned the breed long ago established in Siam is quite peculiar in turning from white to nearly black as age advances. The kittens are white, or nearly so, with blue eyes. The eyes usually remain blue throughout life, but the hair becomes darker with age, passing from cream to pale fawn and pale brown on the body and deep brown to blackish on the extremities, the adult being pale brown on the body with the head, ears, limbs and tail blackish.

Another breed with stabilised coloration, known as the *chaus*-type, is not uncommon in India, and is referred to in some detail below (p. 13); and there are two admitted breeds characterised by the abbreviation of the tail. One of these, in which that organ is reduced to about the length of the hind foot and is frequently "kinked" or bent, is common in Malaya, whence it was many years ago introduced into Madagascar. The other is the so-called "Manx" breed, in which the tail is at most a mere stump, about one inch long. The evidence that this breed arose in the Isle of Man is quite inconclusive. It occurs, but not commonly, in London, where it varies in colour and as a rule exhibits the pattern of *torquata*.

Domestic cats have been carried by their owners from one part of the world to another and occur in all the continents. In some places, moreover, they have run wild and established themselves as obtrusive elements in the fauna. In Europe, Africa and the greater part of Asia where *Felis* is indigenous, it is possible, perhaps probable, that these feral cats interbreed with wild species of the genus, particularly their supposed ancestral forms, *F. silvestris* and *F. lybica*. But there seems to be no evidence that such a cross has ever been detected in the case of the species mentioned or in the case of the less closely related species *F. margarita*, *F. chaus* and others. In America, where the cats are generically distinct from *Felis*, the occurrence of hybrids is very unlikely; and in countries like Madagascar and Australasia, where indigenous species of Felidae do not occur, crossing is out of the question. This gives special interest to the feral cats of such places as Timor, Celebes, Queensland, and Tasmania, which are likely enough to become differentiated and stabilised as distinguishable

forms as well worth studying, if not naming, as the subspecies of other mammals. To further this end, the following notes on the skins and skulls of most of the feral representatives of *F. catus* in the British Museum have been compiled.

Skins of Feral Domestic Cats from Various Parts of the World

Europe

The different varieties of house-cats to be seen in London and other English towns need no description, since they were dealt with in some detail in my paper quoted above. No doubt the same kinds occur in continental Europe, but only one presumably feral skin is available, an example of the *torquata*-type from Hungary.

There is also only one English feral cat's skin (7.2.16.1). This, however, is of exceptional interest. It was captured as a kitten in the New Forest and surprisingly recalls the British Wild Cat (*F. silvestris*), more so than any feral cat examined, in the texture of the coat, which is 40 mm. long on the flank, 45 mm. on the spinal area and in the general colour and pattern, especially the presence of the two strong stripes on the shoulders, a very pronounced feature in most skins of the wild species. It differs, however, in lacking the fullness of the tail of the latter, in having that organ invaded by black above and the head blacker, with the pattern less pronounced. If it had come from Scotland I should without hesitation have regarded it as a hybrid house-cat and *F. silvestris grampia*. But since it was presented to the Museum as a very old animal in 1907, it was probably born in 1890, or thereabouts, when there were certainly no true wild cats in the South of England.

An undated skin (Rothschild Bequest, 39.1661) from "above Luchon" in the Pyrenees probably has the same history as the two examples of *F. silvestris silvestris* described below (p. 31). It differs in several respects from them. The coat, although tolerably full and soft, is much shorter, the hairs on the spine, flanks and tail being only about 35, 23 and 25 mm. respectively. The ground colour above is nearly the same, namely grey, showing buff patches when the coat is disturbed, and the lower side is buff; but the pattern is different, being indistinct on the nape, absent on the shoulders, black on the spine where the stripe is indistinctly double, and on the flanks and legs strong and black; and on the tail, which is narrow and attenuated towards the tip, the stripes, nine or ten in number, extend to the base, those on the distal half of the organ being confluent above, making it black in the middle line. If caught within the geographical range of *F. lybica* (see below, p. 50), this cat might have been regarded as representing a race of that species; but it is no doubt a feral house-cat of the *torquata*-type. A second specimen (39.1664) in the same collection, which has no history, is tolerably similar and may have come from the same place. This I also consider to be *F. catus*.

The Hungarian skin mentioned above (1143. i) was labelled "wild cat, *Felis catus*", the technical name being the one then applied to the typical

European wild cat now known as *F. silvestris*. It is unquestionably a feral domestic cat with the ground colour and strongly marked pattern of the *torquata*-type. The coat is short, with the hairs on the flanks 30 mm. and on the crest 42 mm., the wool on the flanks is greyish buff at the summit, on the spinal area greyish brown; the backs of the ears are brown, contrasted with the grey head, but blackish at the tips and pencilled; the under side is greyish ochreous, the backs of the thighs are richer ochreous and the hind foot is black to the hocks behind. In the brighter tint of the ears, of the wool and of the upper part of the backs of the thighs, this skin differs from skins of typical English house-cats of the *torquata*-type and approaches the North African wild cat *F. lybica sarda*.

The Cretan cat, *agrius*, was described by Miss Bate in 1906 as representing a race of the North African wild cat. In 1907 I stated that it was a feral house-cat; but in 1912 Miller gave it full specific rank as a wild cat related to the Sardinian form, and in 1930 Schwarz reverted to Miss Bate's opinion. The type (5.12.2.15) has the coat 26 and 34 mm. and resembles the feral skin from Hungary in the colour of the ears and nearly in the tint of the wool; but it is paler, clearer grey above, a good deal paler below from the throat backwards, has a whiter face, the pattern less strongly emphasised and less spotty on the hinder part of the body and the hind foot not so black behind in its upper part. But it comes nearest to the feral Tunisian cat described below (p. 15), so near, indeed, as to be describable as a duplicate of it. It also closely resembles several of the skins referred to below as feral house-cats, namely one from Gangootra, North India, and one from New Mexico, the latter differing principally in having the ears apparently dark grey. Quite clearly the evidence is opposed to the conclusion that the type of *agrius*, carrying the name, represents a race of the North African wild cat.

It is of interest to note that although typical *catus*, with the bold blotched pattern, is as common a house-cat as any in England, it is very scarce as a feral form, at all events outside Europe. Out of the large number of feral cats in the British Museum, three only belong to this type, namely one from Meshed, in Persia, and two from different localities in Queensland. According to Blyth it was unknown in India in his time, and none was secured by the collectors for the Bombay Survey of the Mammal Fauna of British India. But in 1938 Col. R. Meinertzhagen secured one in very wild country at Doab, in the Hindu Kush. A great majority of the feral cats, at all events of Asia, Africa and Australia, are either typical *torquata* or red, black, parti-coloured or other mutants of that type.

Asia and Australia

Arabia.—An adult ♂ (95.6.1.61) trapped in the bazaar in Aden by Colonel Yerbury, 18 February, was regarded by him as a domestic cat, but was quoted as *Felis maniculata* by Thomas (*Proc. Zool. Soc.*, 1895, p. 507). Yerbury's opinion was, I think, correct. The coat, although at its best according to the date, is harsh, thin, with very little wool, and short, the hairs of the flanks being about 20 mm. and of the crest 30 mm., very different from the soft full coat of

genuinely wild specimens; the general colour is greyish brown and the deeper brown pattern is fairly well defined, the black of the spinal area breaking up into longitudinal stripes; the black of the hind foot is restricted to its lower part. The skull with a condylobasal length of 89 mm. is about as long as in Philby's adult ♂ from Wadi Thar (see under *F. lybica tristrami*, p. 114), but the hullae are smaller, only 19 mm. long, as compared with 22 mm., and the carnassials are also smaller, the upper being 10 and the lower 7½ mm. long, whereas in the ♂ of the Arabian wild cat they are 11 and 9 respectively. The bullae and teeth are typically smaller in domestic cats, feral or tame, than in related wild races.

The other specimen (99.11.6.33), shot in desert scrub by Percival and Dodson at Lahej, near Aden, August 27, was regarded as a genuine wild cat and identified by Thomas as *F. maniculata* (Proc. Zool. Soc., 1900, p. 100). But since it has a coat similar to the last, although even thinner in accordance with the date, I regard it as a feral tame cat. It differs from the Aden specimen in colour, being pale sandy grey with fainter pattern, suggesting faded summer coat. Since, however, its bullae and teeth are as large as in Shortridge's Jerusalem specimen, it may be a half-bred specimen.

Persia.—Three strikingly different skins. An adult ♀ from Meshed (Sykes, 13.4.2.1) is a handsome, full-coated example of the blotched tabby (*catus*), a rare feral type,[1] differing entirely from two skins of the wild cat of Meshed which are assigned to *F. lybica caudata* (see below, p. 126). An adult ♂ from Seistan (6.1.2.4) might be mistaken for a wild cat, since it is only a little darker than the two skins from Meshed just mentioned; but its coat is much thinner and shorter, its pattern is stronger everywhere, especially on the shoulders, limbs and lower side, and its skull and teeth are a little smaller. It is possibly of mixed breed. A second from Seistan (8.1.13.4) is nearly uniformly fawn-coloured above with the spinal crest and back of the ears red, the pattern absent on the body and head, obscure on the outer sides of the limbs, strong and black only on the end of the tail. This skin recalls *F. chaus* in several respects, and although it has a long tail it may be a hybrid between that species and a feral house-cat.

Djarkent, in Semiryechensk, East Turkestan. A young adult ♂ skin (14.5.10.60), October, killed by Rückbeil, with two examples of *F. lybica caudata* (see below, p. 125) differs from them in its less luxuriant coat, dark grey ground colour above, black ears, blackish head, conspicuous black spinal band on the hind back and loins, and heavy black body-pattern, consisting of stripes on the neck and large scattered black spots on the flanks and below and strong bands on the legs. The wool, moreover, is dark grey on the flanks, black on the spinal area. The skull and teeth are also smaller than in the wild cat of the district. It may be a mongrel between the latter and a feral house-cat, but in its general colour and style of pattern, it closely resembles the skin of a London cat I figured in 1907 (pl. 9, fig. 3), except that the latter is largely albino on the limbs and below.

[1] As recorded above (p. 10) Col. Meinertzhagen shot one in very wild country at Doab, in the Hindu Kush.

Kandahar.—An imperfect skin (91.10.7.14) of the *torquata*-type with unusually luxuriant coat, 30 and 36 mm. long, the flanks speckled greyish-white and fuscous, the spinal area buff and black, the wool dull buff on the flanks, a little darker on the crest and turning deep grey on the shoulders; the pattern brown and obscure. This skin is a topotype of *F. huttoni*, Blyth.

Tibet.—A single skin (Hodgson, 45.1.8.218) is patched red and white, the red showing faint *torquata*-pattern.

India.—A large series of skins shows that domestic cats have run wild practically all over the country, and in some places have established themselves definitely as wild forms. There are three main phases: typical grey *torquata* in various shades; red mutants of *torquata*; and the *chaus*-type.

The dominant form is the grey *torquata*. According to Colonel Ward, who regarded it as a valid species, this is abundant in Kashmir, is quite unmistakable, and appears to have established itself and to breed tolerably true to type. The only skin in the Museum from that country came from Srinagar (O. B. St. John, 91.01.7.12) and is a little abnormal in colour, being dull grey with hardly any black and white speckling in the pelage.

From Gopalpur, Kangra (Wells, 44.1–2) there are two skins, one from 5,000 ft. is brownish grey and very closely matches the skin from Kandahar; the other, 4,500 ft., is clearer grey; both are creamy buff below.

A darkish grey skin from Nepal (Hodgson, 45.1.8.289) is a topotype of *torquata* and agrees closely with Cuvier's description; and the type of *inconspicua*, Gray, probably from Nepal, belongs to the same kind, but has the pattern less distinct. A skin from Gangotri (118 a), labelled *inconspicua* by Gray, is tolerably similar.

From south of the Himalayas is a skin from Sambhar, Rajputana (Adam, 85.8.1.20), which is like the greyer of the two Kangra skins. Two from Kathiawar, 200 ft. (Crump, 44.3–4), differ a good deal individually. One (44.3) decidedly brownish grey, with brown pattern, is like the darker of the two skins from Kangra, except that the pattern is better defined owing to the much shorter coat, but the lower side from behind the white chin is buff. The other (44.4) is dark, blackish grey, with black pattern and greyish under side. From Kolar Town, East Mysore, 2,786 to 4,026 ft. (Shortridge, 13.4.11.44–47), there are four very short-coated specimens, in three of which the pattern is brownish and rather faint, and the ground colour greyish with very little black speckling, the under side being whitish; but in the fourth the pattern is blacker and stronger. The number of specimens procured at this place suggests that the cat has established itself as a wild form. A skin from Halery, Coorg (Shortridge, 44.10), is clear grey with blackish pattern very like the skin from Sambhar.

In the red mutants of *torquata*, which are darker on the spinal area than on the flanks, the pattern is retained at least on the legs, unless they are white, and on the end of the tail, but may be altogether suppressed on the body, and the under side is always white. One from Sikkim (Hodgson, 58.6.26.53) has the pattern suppressed on the upper side of the body and faint on the legs and tail. One from Kumaun (Stevens, 44.15) has the body-pattern represented by very small spots on the flanks. One from Philibhit, Rohilkund, 800 ft. (Crump,

44.14), 7 February, has the ground colour pale red on the back, whitish on the flanks and the pattern distinct. One from the United Provinces (St. G. Burke, 27.2.14.12) is deeper red than the last, with the normal *torquata*-pattern strongly pronounced. One from Sukkur, Sind (Prater, 44.13), March 24, has the coat longer and thinner than in the skin from Philibhit, and the ground colour whiter and throwing into greater relief the pattern which is red on the hinder part but brown on the shoulders, nape and head. This skin seems well adapted by colour to its desert environment. One from Sehore, in Bhopal, 1,700 ft. (Captain Whitehead, 9.6.10.12), has the pattern very faint, and one from Mogul Serai, United Provinces (Stewart Betton, 6.6.15.1) resembles it in that respect, but has white fore legs, hind feet, and a median white band on the lumbar region, a very unusual place for an isolated white patch to occur. A specimen brought from Bombay (H. C. Brooke, 44.20) is much deeper red than any of the preceding and has no pattern on the body.

Another mutant of *torquata*, called the "*chaus*-type" by Blyth, occurs sporadically at least in northern India. The pattern persists only on the base of the limbs, the end of the tail and the ventral surface, and may be strong or weak; the general colour of the body is grey or greyish due to close speckling of the hairs with black and whitish or buff, with the spinal area considerably darker and the under side white; the ears are dark brownish grey or rusty ochreous. Blyth believed this cat, which has not been recorded wild in any countries but India and Burma, to result from the crossing of house-cats with *Felis chaus*. But the skull and the tail are as in *Felis catus* and the spinal crest is not developed as in *F. chaus*.

A couple of specimens in the collection (Zool. Soc., 55.12.24.263, and Blyth, 66.11.20.1) are labelled "Domesticated Cat of India". Two feral specimens may be selected for description to illustrate individual variation in the breed. One from Dening, in the Mishmi Hills, 2,250 ft. (Wells, 23.1.7.8), is darker, more buff-grey with reddish ears and the pattern on the limbs, tail and under side strongly pronounced. The other from Hasimara, Bhutan Duars, 600 ft. (Baptista, 16.7.29.49), is clearer grey, with dark grey ears and the pattern absent on the tail and nearly suppressed on the outer side of the limbs and on the belly. A third from Nimiaghat, Hazaribagh (Crump, 37.3.24.21), is nearly intermediate in the distinctness of the pattern, and has the ears as in the skin from Bhutan Duars.

Ceylon.—The feral occurrence of typical *torquata* in the island is attested by a skin from Ambawela, collected by E. W. Mayor (44.27 a), who also shot a black specimen at Yatiyantota, 500 ft. (44.22).

Burma.—The feral cats are similar to those found in India, as attested in particular by one of the *chaus*-type secured by Mackenzie (44.7) at Toungoo, 500 ft., which is slightly buffy grey with stripes on the insides of the legs, on the end of the tail and, very obscurely defined, on the head. Also at Toungoo, but at a lower level of 100 ft., the same collector shot two red examples of *torquata* (44.8.12), one with the pattern very faint, and a typical grey *torquata* (44.6), with white legs, labelled "domestic cat". A specimen from Maymyo, 3,500 ft. (Shortridge, 44.11), is a clear grey *torquata* with very faint pattern

and the paws and under side white; and one from Paunggaung, North Shan States (Shortridge, 44.9), is a faintly striped brown *torquata*. The same collector trapped at Victoria Point, Tenasserim, a dark greyish brown specimen (44.16) without pattern, but with white on the paws, throat and chest, and with a very short tail about equalling the hind foot in length, representing a breed unknown in India, but common in Malaya. A note on its label states that "an enormous percentage of cats in the east Indies have stunted tails".

Of the unmistakable Siamese breed, of which no feral examples seem to have been recorded, enough has already been said; and the traditionally alleged Chinese breed, with pendulous ears, is known to me only from the original description.

Philippine Islands.—A female of the *torquata*-type shot wild by J. Whitehead in North Luzon is interesting from having the bright tinted ears, wool and genital area occurring as in the skin from Tunis, and in the type of *agrius*. It differs principally from those two skins in being sandy grey instead of ashy grey above, and in having the lateral stripes more broken into spots. In its general colour above it differs from most normally coloured skins with the *torquata* pattern from the Oriental Region, coming nearest to one from Bonthain Peak, Celebes. It was discussed at some length by Thomas (*Ann. Mag. Nat. Hist.* (6), 18, p. 245, 1896), who correctly identified it as a feral *F. domestica*; but it is not quite like the specimen from Celebes, nor does it resemble *F. chaus*, as he stated.

Malay Archipelago.—A black skin (C. Darwin, 68.2.19.118), with white on the face, feet and chest, has a short tail hooked at the end apparently resembling in this respect the type of *madagascariensis*.

Timor.—Three skins (Frost, 40.377–379) from Amarassie, are topotypes of *F. megalotis* and are typical examples of dark grey *torquata*, with blackish grey ears. On account of its record by Meyer from an island to the east of Wallace's line, the locality of this cat was disputed by Elliot and, following him, by Wallace, and tacitly ignored by Mivart. But the arrival in Holland of additional specimens from Timor induced Jentink to uphold the species as valid (*Notes Leyd. Mus.* 13, p. 219, 1891). None of these authors seems to have been acquainted with the common striped tabby house-cat of Europe.

Celebes.—A skin from Macassar (Wallace, 57.8.6.1) is dark greyish brown above, darker on the shoulders, nape and head, and buff below, with the pattern everywhere distinct. Of two skins from the same locality (Frost, 34.7.24.1–2) one is very similar to the foregoing, but the other is grey with black pattern. One from Rantekaroa, Quarles Range, 6,600 ft. (Frost, 40.376), is dark grey with obscure pattern; another from Tamalanta, 3,300 ft. (Frost, 40.384), is brown on the back, grey on the flanks and legs, with the pattern strong; and one from Bonthain Peak, 6,800 ft. (Everett, 97.1.3.8), is of the brown type, resembling two of the Macassar skins. These skins from Celebes are on the average browner than those from Timor.

Australia.—A specimen from the Annan River, Cooktown, Queensland (Sherrin, 23.1.5.27) and one from Rollingstone, 23 miles north of Townsville, North Queensland (Wilkins, 23.12.6.8) have the bold pattern of typical *catus*.

Judging from a note by Sherrin stating that he shot several of these cats near Cooktown because they ate the small mammals in his traps, it seems that the breed has established itself at least in that district. But a specimen from Mount Driven, South Central Queensland (Young, 23.10.4.1) is a typical grey *torquata* with black pattern and one from Tasmania (Gunn, 127 g) is of the same breed.

AFRICA AND AMERICA

Tunis.—An adult ♂ (Sir Thomas Reade, 55.12.24.257) so closely matches the type of *agrius*, the Cretan Cat, described above, that it is unnecessary to enumerate its external features. It apparently differs only in having the wool on the flanks and spinal area a shade less bright. In its ashy grey colour above and bold pattern everywhere it differs strikingly from the Tunisian wild cats described below as *F. lybica sarda* and *F. lybica lybica*. Since the skull has the occiput cut away, its condylobasal length can only be estimated at 86 mm.; and although the postorbital area is narrow and the temporal ridges only 7 mm. apart at the suture, the skull is not strongly moulded, the ridges in question being very weak; the teeth are smaller on the average than in ♂ wild cats, the upper canine being only 4 mm. The small size of the skull and teeth confirms the conviction conveyed by the skin that this cat is a feral house-cat.

Egypt.—The cat from Egypt (165 a), described by Gray as *F. pulchella*, a name hitherto assigned to the synonymy of *lybica* or *ocreata*, must be regarded as a feral domestic cat of the *torquata*-style of pattern. The type is a small, now much faded, adult or subadult female with the flanks whitish, the crest, of which the hairs are 38 mm. long, banded brown and buff and the fore part from the shoulders to the head sandy buff; the ears are the same tint as the crown and the face is white with a faint patch in front of the eye, a red upper genal stripe; there are faint stripes on the crown and on the sides of the body, brown stripes on the limbs and a blackish bracelet; the fronts of the limbs and the lower surface from the chin backwards are white. The skull and teeth are too small for *lybica*, smaller indeed than in most females of *F. catus*, tame or feral. The skin of a kitten (165 b), with the same history, is soiled and faded, but seems to have been pale like the type.

Evidently very similar to the type of *pulchella* is an adult ♂ cat collected at Ber Victoria, Wady Natron, Lower Egypt (3.8.1.1) by N. C. Rothschild. It is red all over the upper side, white below, with the pattern of the *torquata*-type on the head, nape and body very faint, but stronger on the cheeks, legs and tail, with the soles of the feet buff, not black. The skull, although well developed, with wide zygomata and narrow cranium and postorbital area, is short and has small bullae and teeth, differing in these respects from the adult ♂ skulls from Upper Egypt and the Sudan assigned to the Egyptian wild cat (*F. lybica lybica*) described below (p. 61).

Anglo-Egyptian Sudan.—The skin of a young adult ♂ (4.11.3.13) from Meroe, on the Upper Nile, March 17, is regarded as a feral domestic cat because in its darker, greyish brown general colour, dark ears of nearly the same tint, closely matching the head, the dull tinted wool and thin short winter coat, only

23 and 31 mm. long, it differs from the sand-coloured skins regarded as typical *F. lybica lybica* from the Nile Valley. The pattern on the flanks is perceptible but faint, on the legs stronger and on the lower side black, thrown into relief by the whitish ground colour. The flesh measurements in English inches are: head and body $20\frac{1}{5}$; tail $12\frac{2}{5}$; hind foot 5; ear $2\frac{2}{5}$. The skull, although not quite full-sized, is considerably longer than that of the ♂ from Wady Natron, but being undeveloped, although the sagittal and occipital crests are about as large, has the cranium and postorbital area wider; its bullae too are much more strongly inflated.

The skin of an adult ♀ (1.5.5.13) from Shendy, south of Meroe, February 23, differs strikingly in its colour and coat from the specimen from Shendy referred to *Felis lybica lybica* (p. 64). It closely resembles the skin from Meroe in its superficial colouring and thin winter coat, which is even shorter, only 18 and 31 mm. long; but it differs in having the wool on the flanks pale buff, on the spinal area ochreous, the pattern on the body more distinct and the black of the hind foot restricted to the area of the pads. Its flesh measurements in English inches are: head and body 19, tail $12\frac{2}{5}$, hind foot $4\frac{3}{5}$, ear $2\frac{1}{3}$. In all its dimensions the skull agrees very closely with those of the two tolerably similarly coloured but luxuriantly coated ♀ specimens from Nakheila on the Atbara and the Shabluka Hills, north of Omdurman, respectively, referred to below (p. 68) and left without subspecific name; and like those specimens and the one from Meroe, it has the bullae much more strongly inflated than in the skulls from Wady Natron, Bakel and Kilimanjaro entered in the table.

Captured at Shendy at the same time as the last, and confirming the view that the latter is a feral domestic cat, was a red kitten (1.5.5.14) very similar to the adult ♂ from Wady Natron.

A young ♀ specimen (1.8.8.21), about two-thirds grown, from Fashoda, is provisionally regarded as the kitten of a feral domestic cat because it is hardly distinguishable in coat, colour and pattern from the adult ♀ from Shendy, described above.

Gold Coast.—The skin of a black variety showing no pattern (Armitage, 44.26).

Abyssinia.—A skin from Dangila representing the "domestic cat" of North-west Abyssinia (Cheesman, 44.27) is of the *torquata*-type, but bright red with very faint stripes on the body, a little stronger on the legs and strong on the tail, as in the skin from Wady Natron. It breeds true to type according to Cheesman.

Lado in the Sudan.—(Emin Pasha, 87.12.1.9) An immature skin of the *torquata*-type.

Somaliland.—A skin (34.9.14.8) without skull, from Bulhar, has the coat very thin, short and harsh, and the pattern of the *torquata*-type strongly pronounced.

Sokotra.—The feral domestic cat of this island was described by Ogilvie-Grant (*Nat. Hist. Sokotra*, etc., p. 6, 1901). From information supplied by natives he reported that it is subject to great variation in colour, some specimens being striped, some mostly black. There is no skin in the British Museum;

but a skull, apparently of a young adult ♀ (81.1.6.1), is peculiar for the presence of a distinct but shallow concavity on the fore part of the frontals just behind the nasals. As shown by the table of measurements, the bullae are as large as in the above-described specimens from Meroe and Shendy. This is interesting because the wild cats of Sokotra are beyond all doubt the descendants of imported house-cats.

Kilimanjaro.—A black skin of an adult ♂ (37.8.18.16) from the south-east slope of the mountain, 5,000 ft., shows no trace of pattern, and is regarded as a feral domestic cat on the evidence of its colour and skull. The skull, the largest of the African feral cats, is as large and well developed as those of the wild cats of Kenya and Tanganyika, but differs from them in its noticeably smaller bullae and teeth.

Portuguese East Africa.—An adult ♀ from Inhambane (6.11.8.43) is of the *torquata*-type in colour and pattern, thus differing entirely from the wild cats of South Africa. Its skull, also, although imperfect, is considerably smaller. C. Grant, who collected this specimen, told me that in Inhambane he saw no examples of the typical South African wild cat (*F. lybica cafra*) with which he was well acquainted.

Machili River, North Rhodesia.—A skin, without skull, blotched grey and red, both colours showing typical *torquata*-pattern (Gordon Lancaster, 35.9.1.15 b).

Zululand.—A skin (Grant, 44.25), shot in the forest at Sibudeni, 20 miles north-west of Eshowe, 3,500 ft., is patched white and grey, the grey showing typical *torquata*-pattern.

British Bechuanaland.—A black skin showing *torquata*-pattern (Pollard, 37.9.4.1).

Great Karas Mountains, South-west Africa.—A red skin showing *torquata*-pattern (Shortridge, 44.24).

Madagascar.—A skin from Voluma (70.5.5.38) and one from the Forest of Ankafana, east of Betsileo (Cowan, 82.3.1.7) are of the *torquata*-type. These two skins differ from the type of *madagascariensis* in having tails of normal length.

America.—The only skin (Warwick, 57.6.22.1) is an example of *torquata*, typical in colour and pattern, from the State of New Mexico; but in the first decade of this century Gibson exhibited at a meeting of the Zoological Society a similar skin from the Argentine as a specimen of the Pampas cat (*Pajeros*).

Structural Variations in some Skulls of *Felis catus*, Tame and Feral, from various parts of the World

Of ♂ skulls the first entered on the list of those from Europe was formerly in the Tring Museum and has no locality. It is regarded as probably from that continent, because Rothschild identified it as *F. silvestris*. Both its skin, which is of the *torquata*-type, and its skull show that it does not belong to that species. I infer that it is referable to *F. catus* from the small size of the bullae and teeth, the canine being only 3½ mm. at the base, and that the animal was feral rather

MEASUREMENTS AND WEIGHTS OF FERAL EXAMPLES OF *FELIS CATUS*

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*	*Weight*
			in.	in.	in.	in.	lb.
♂ old	New Forest, England	7.2.16.1	20	10⅝	4⅛	2⅜	—
♂ yg. ad.	Djarkent, Turkestan	14.5.10.60	17⅜	10¼	4⅝	2⅛	—
♂ ad.	Srinagar, Kashmir	91.10.7.12	22	12	—	—	—
♂ ad.	Gopalpur, Kangra	44.1	23⅛	12	5	2⅝	—
♂ ad.	Hasimara, Bhutan Duars, *chaus*-type	16.7.29.49	19⅛	11⅞	5	2⅛	—
♂ ad.	Mishmi Hills, *chaus*-type	23.1.7.73	19⅜	11⅜	5	2⅝	6½
♀ yg. ad.	Hazaribagh, *chaus*-type	37.3.24.21	16½	10⅛	4⅜	2¼	4
♂ ad.	Philibhit, Rohilkund	44.14	20	11⅜	5⅛	2⅝	7¼
♂ ad.	Sehore, Bhopal	9.6.10.12	22⅝	12⅛	5⅛	2⅜	—
♂	Kolar Town, Mysore	13.4.11.45	19⅛	11⅜	4⅜	2⅛	—
♂	,, ,, ,,	13.4.11.44	17⅜	9⅜	4⅛	2⅛	5½
♀	,, ,, ,,	13.4.11.47	18⅜	11	4⅛	2⅛	—
♂ ad.	Junagadh, Kathiawar	44.3	20⅛	11⅜	5	2⅛	9½
♂ ad.	Toungoo, Burma, *chaus*-type	44.5	20⅛	9⅛	4⅝	2⅛	—
♂ ad.	Toungoo, Burma, *chaus*-type	44.12	19⅛	10⅛	4⅛	2⅛	—
♀ ad.	Maymyo, Burma	44.11	18⅜	9⅜	4⅜	2½	—
♀ ad.	Victoria Point, Tenasserim	44.16	18⅛	4	4⅛	2⅛	—
♂ ad.	Amarassie, Timor	40.379	23⅛	12	—	1⅛	—
♀ ad.	Tamalanta, Celebes	40.384	20	10⅜	—	2⅜	—
♂ ad.	Wady Natron, Egypt	3.8.1.1	20⅜	9⅜	4⅜	2	—
♂ yg. ad.	Meroe, Upper Nile	4.11.3.13	20⅛	12⅜	5	2⅜	—
♀ ad.	Shendy	1.5.5.13	19	12⅜	4⅜	2⅜	—
♂ ad.	Bulhar, Somaliland	34.9.14.8	21¾	11	4⅜	2⅛	—
♀ ad.	Inhambane, Portuguese E. Africa	6.11.8.43	18½	10⅜	4⅜	2⅛	—
♀ ad.	N.E. of Eshowe, Zululand	44.25	18	11	4⅛	2⅜	—

than tame is suggested by its being preserved by Rothschild. The skull, which in practically all its dimensions agrees closely with that of the second on the list, a tame London cat, is muscularly well moulded, with constricted postorbital area, temporal ridges 7 mm. apart, confluent postorbital processes on each side, and salient occipital crest. Its only exceptional feature is the wide interorbital area.

The only available skull of a British feral cat is the one from the New Forest, a very old, nearly toothless male. Owing to the unusual prominence of the occipital crest, the total length exceeds by a few mm. that of the larger of the two male cats from 'London *a*', although its condylobasal length is shorter by about the same amount. For the same reason the sagittal crest of the interparietal is longer. It differs noticeably in some other respects. The temporal ridges are strong but 18 mm. apart at the suture, and define a definite area

about 27 mm. long; the postorbital bars are complete and exceptionally wide; the lower rim of the orbit is strongly arcuate, the nasals are short, with a median length of 19 mm., have straight, evenly convergent sides and bullae are low. In 'London *b*', a much younger skull, the temporal ridges are weak but only 6 mm. apart on the suture and confluent 8 mm. behind it; the postorbital bars are incomplete by about 6 mm., the lower rim of the orbit is less arcuate, the nasals are 21 mm., are mesially constricted and the bullae are higher. 'London *b*' differs from '*a*' in the slightly more arcuate orbits, more steeply sloped face, owing to the development of air-cells in the frontals, and in its higher bullae. In its widely fused postorbital bars, unusually prominent occipital crest, strong and widely separated temporal ridges and broad, short, unconstricted nasals, the New Forest cat differs from all the other skulls entered in the table, all of which are more like the London skulls.

The adult ♂ skull from Tiflis, which has no skin, probably represents the apparently common black Caucasian cat described as *F. daemon* by Satunin, who regarded it as a valid species. The skull differs from that of the wild cat of the Caucasus (*F. silvestris caucasica*) in its more prominent forehead, a common feature in *F. catus*, and in its smaller teeth.

An Indian skull of some interest is that of Brooke's red cat from Bombay, which is about the same age as the skull 'London *a*', but although a little narrower, is decidedly longer owing to the greater length of the jaws, which have the nasal branch of the premaxillae exceptionally wide. In the two skulls the length from the foramen magnum to the suture of the palate in the middle line is the same, namely 63 mm., but in the Bombay skull the length from that point to the end of the premaxillae is 25·5 mm., whereas in the London skull it is 20 mm. This elongation of the jaws is accompanied by less steeply sloped and longer nasals, 25 mm. in the middle line. The bullae also are noticeably bigger.[1] The ♂ skull from Mogul Sarai (6.6.15.1) is almost the same length as the one from Bombay, but it is older and more robust with much stouter, almost meeting postorbital processes. Hodgson's ♂ skull from Nepal (45.1.12.516), a topotype of *F. torquata*, is very like 'London *a*' in every respect but, being older, has bigger postorbital processes and sagittal crest. The two ♂ skulls of the *chaus*-type from Bhutan Duars (16.7.29.49) and the Mishmi Hills (23.1.7.78) are of exactly the same type as the preceding and show no trace of *chaus*-descent. The ♂ Siamese skull (91.10.6.1) is also quite unmistakably of the *catus*-type, although the frontal postorbital processes are unusually slender for a muscularly well-moulded skull, with strong posterior, sagittal and occipital crests. The ♂ skull from South-west Timor (40.377), a topotype of *F. megalotis*, has a rather unusually narrow and elongated muzzle, with the upper cheek-teeth a trifle longer and the nasals 24 mm. in the middle line, 3 mm. longer than in the

[1] The skull of this Bombay cat is the longest of all the skulls of *F. catus* examined; but its measurements both in length and width agree almost precisely with those of a ♂ skull (No. 2.6.3.1) from Baranza, River Drave, Hungary, given by Countess Bathyany to Dr. Hamilton, who figured it as representing the European Wild Cat *F. silvestris* (see below, p. 35). This skull is much older than the skull from Bombay and differs from it principally in having a complete low sagittal crest extending from the suture and larger, more nearly meeting postorbital processes, both age-characters.

topotype of *torquata*, which has a rather longer skull. The nasals and teeth are even a shade longer than in the much bigger skull from Mogul Sarai. The interorbital area is flat and nearly horizontal and the extension of air-cavities into the anterior part of the frontal bones gives prominence to this portion of the face and makes the slope of the anterior half of the nasals abrupt and steep.

The skull from Bonthain Peak, Celebes, closely matches the skull from Timor except for being older and bigger, having a strong occipital crest, a complete but very low sagittal crest rising to 4 mm. on the interparietal, and in having more strongly compressed, shorter nasals, 20 mm. long mesially; and the imperfect skull from Macassar is like the last. The skull from near Townsville, Queensland, has the same prominent forehead as the last three, with the nasals as long as in the Timor skull, but almost unconstricted. The Tasmanian skull is similar, with the nasals as in the Timor skull. The noticeable prominence of the forehead in these skulls is here and there foreshadowed in skulls to the west of Wallace's line; but it is undeveloped in the young adult skull from Mount Driven, Queensland, although it is manifest in the skull from Kilimanjaro. The skull from New Mexico has the forehead normally sloped and lightly convex.

Adult female skulls usually resemble young male skulls in their smaller size and less manifest muscular moulding, especially attested by the relatively wider postorbital area. They vary individually like ♂ skulls. In the English skull (127 f) the upper part of the face at the junction of the frontals and nasals is very prominent, so that the greater part of the nasals is abruptly and steeply sloped, even more so than in the ♂ skull from Timor, and the highest point of the skull is just behind the postorbital processes; but in 127 k the highest point is at the fronto-parietal suture, there is no marked fronto-nasal prominence and the nasals are not abruptly and steeply inclined. In the skull from Meshed the area just behind the postorbital processes is inflated and high and from that point the upper surface forms a nearly straight incline to the anterior nares. In the Rajputana skull the highest point is between the postorbital processes, from which the facial profile slopes with a slightly sinuous convex curve; the bullae are strongly inflated, about 11 mm. high, as compared with about 8 mm. in other ♀ skulls, and pm^1 and pm^2 are retained on both sides. The skull of the *chaus*-type from Hazaribagh closely resembles the last in shape, but has normal dentition and bullae. The skull of the same mutant labelled "India" is a longer and older skull, but owing to its strong muscular moulding, resembling a ♂ in that respect, has the postorbital area and the cranium narrower. Also exceptionally strongly moulded and male-like is the skull of the Siamese ♀, which has much flatter frontal bones than the younger ♂ skull of the same breed, and has even narrower postorbital processes. In two additional skulls of this breed, however, these processes are normal in shape.

The ♀ skull from south-west Timor is the same shape as the ♂. A young adult ♀ skull (58.4.8.3), without skin, from St. Vincent, presumably in the Cape Verde Islands, has one or two points of interest. If it comes from the Cape Verdes, it is a topotype of *F. bouvieri*, Rochebrune. It is small and weakly

Skull Measurements of Tame and Feral Specimens of *Felis catus*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	*pm^4*	*m_1*
	EUROPE		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Europe ? . .	39.1662	99	92	69	42	31	22	25	19 : 14	65	10	7
♂ ad.	London . . .	*a*	99	92	71	42	29	18	26	19 : 14	66	10½	8
♂ ad.	,, . . .	*b*	95	87	70	42	28	18	25	19 : 15	63	10	7½
♂ ad.	New Forest . .	7.2.16.1	101	89	70	43	34	19	26	19 : 14	68	9½	—
♂ ? ad.	England . . .	46.5.11.9	90	82	61	40	31	16	22	16 : 13	61	—	7
♂ ad.	,, (Manx-breed)	C 7	84	78	63	41	30	17	21	16 : 13	58	10	7½
♂ ? ad.	,, . . .	46.4.4.2	80	74	56	40	30	15	20	17 : 13½	52	9½	5
♀ ? ad.	,, . . .	41.1.14.46	76	72	54	42	32	13	18	17 : 14	—	10	—
♂ ad.	France . . .	19.7.7.1980	96	88	67	42	32	17	34	19 : 15	63	11	8
♂ ad.	,, . . .	19.7.7.2335	95	90	67	44	32	19	26	19 : 15	64	10	8
♀ ad.	Alva Prov., Portugal	36.2.5.20	82	75	56	40	31	15	20	18 : 15	51	9½	7

Skull Measurements of Tame and Feral Specimens of *Felis catus*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	*pm^1*	*m_1*
	ASIA		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♀ ad.	Lahej, Aden	99.11.6.33	89	82	64	42	33	17	21	20 : 15	60	10	8
♂ ad.	Aden	95.6.1.61	96	89	73	42	33	19	27	19 : 15	66	10	$7\frac{1}{2}$
♂ yg. ad.	Djarkent	14.5.10.60	88	82	61	42	32	16	22	18 : 15	59	10	$7\frac{1}{2}$
♂ ad.	Tiflis	20.7.4.2	93	86	64	42	32	19	24	18 : 15	63	10	7
♀ ad.	Meshed	13.4.2.1	83	75	58	40	27	15	21	17 : 13	55	10	7
♂ ad.	Seistan	6.1.2.4	98	88	71	45	32	19	25	18 : 15	65	$10\frac{1}{2}$	8
♂ ad.	Srinagar	91.10.7.12	—	(92 ±)	70	43	32	18	24	20 : 15	66	10	8
♂ ad.	Nepal	45.1.12.516	98	90	70	41	30	18	24	19 : 15	66	10	8
♂ ad.	Mogul Serai	6.6.15.1	102	95	70	43	33	22	27	19 : 14	69	10	$8\frac{1}{2}$
♂ ad.	Bombay	44.20	103	95	70	42	26	17	26	20 : 15	68	10	$7\frac{1}{2}$
♀ ad.	Sambhar	85.5.1.20	86	80	62	43	34	16	21	20 : 16	56	11	$7\frac{1}{2}$
♂ yg. ad.	Kolar, Mysore	13.4.11.45	90	82	63	42	34	16	23	19 : 13	58	11	8
♂ ad.	Mishmi Hills, *chaus*-type	23.1.7.73	96	89	67	42	31	18	24	20 : 16	63	(10 ±)	7
♂ ad.	Bhutan Duars, *chaus*-type	16.7.29.49	95	86	68	41	30	18	25	18 : 14	63	11	8
♀ ad.	Hazaribagh, *chaus*-type	37.3.24.21	81	73	56	38	31	16	20	18 : 14	52	9	7
♀ ad.	"India," *chaus*-type	45.4.28.1	84	78	59	38	28	15	22	18 : 15	56	10	$7\frac{1}{2}$
♂ ad.	Siamese breed	91.10.16.1	92	84	68	41	30	18	24	18 : 16	61	10	(7 +)
♂ ad.	,, ,,	C 18	96	90	68	43	33	18	24	19 : 15	64	10	7
♂ ad.	,, ,,	44.21	89	83	68	40	28	16	24	17 : 14	60	10	8

Skull Measurements of Tame and Feral Specimens of *Felis catus*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	pm^4	m_1
	AUSTRALASIA AND AUSTRALIA		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ yg. ad.	South-west Timor .	40.377	94	87	63	43	29	15	22	20 : 16	56	11	9
♀ yg. ad.	,, ,, .	40.378	82	75	58	39	30	16	20	17 : 13	54	9	7
♂ ad.	Macassar, Celebes .	57.8.6.1	—	—	(74 ±)	—	33	19	24	—	70	11	$7\frac{1}{2}$
♂ ad.	Bonthain Peak, Celebes . .	97.11.3.8	99	91	71	44	30	18	23	19 : 15	65	$10\frac{1}{2}$	$7\frac{1}{2}$
♂ ad.	North Queensland .	23.12.16.8	—	—	70	45	31	21	25	—	67	10	$8\frac{1}{2}$
♂ yg. ad.	Mt. Driven, Queensland . . .	23.10.4.1	93	85	63	42	32	18	22	20 : 14	58	$10\frac{1}{2}$	8
♀ ad.	Queensland . .	23.1.5.27	88	82	66	40	31	22	27	$17\frac{1}{2}$: 15	59	9	7
♂ ad.	Tasmania . .	127 g	98	91	71	44	31	19	25	19 : 16	—	11	—

SKULL MEASUREMENTS OF TAME AND FERAL SPECIMENS OF *FELIS CATUS*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	*pm*^{1}	*m*$_1$
	AFRICA AND AMERICA		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Tunis	55.5.24.257	—	—	61	45	30	17	23	—	61	10½	8
♂ ad.	Wady Natron, Egypt	3.8.1.1	88	79	68	39	28	16	23	18 : 12	60	10	7
subad.	Egypt (type of *pulchella*)	165 a	78	—	60	40	33	14	16		52	9	7
♀?yg.ad.	Sokotra	81.1.6.1	79	76	54	40	31	14	20	19 : 15	52	10	7
♀ ad.	St. Vincent, Cape Verde Islands	58.4.8.3	80	74	56	41	32	16	19	17 : 13	52	9	6
♀ ad.	Bakel, Senegal	19.7.7.3093	87	80	63	40	32	17	22	16 : 13	60	9½	8½
♀ ad.	Bama, N. Cameroons	27.9.10.1	81	74	59	39	31	15	21	17 : 12	54	9	6½
♂yg.ad.	Principe Is., Gulf of Guinea	11.6.12.13	—	—	58	39	29	17	22	—	57	10	7
♂ ad.	Kilimanjaro	37.8.18.16	100	90	71	43	31	20	23	17 : 13	65	10	7
♀ ad.	Inhambane, P.E.A.	6.11.8.43	—	(78)	60	40	31	17	20	—	55	10	8
♂yg.ad.	Meroe, Upper Nile	4.11.3.13	92	86	66	43	33	18	24	20 : 14	63	10½	8
♀ ad.	Shendy, Sudan	1.5.5.13	87	81	62	39	31	17	23	19 : 14½	60	11	8
♂ ad.	New Mexico	87.6.22.1	98	89	72	42	33	18	26	20 : 14	66	11	8
♀ ad.	Last Hope Inlet, Chile	14.7.12.3	83	77	61	43	34	15	21	18 : 13	58	10	7½

moulded, like the type of *pulchella*, with the temporal ridges 17 mm. apart, no sagittal and hardly a trace of occipital crest. It closely matches the English skull (127 f), but the brow is not so prominent at the base of the nasals, which are consequently rather less steeply sloped; but its chief peculiarities lie in its dentition. Although not fully adult, it has no trace even of the socket of pm^2 on either side, as in 127 k; the carnassials are small and pm^4 is remarkable for the great reduction in size of its inner lobe, a feature in which it resembles the dwarf South African species, *Felis nigripes* (p. 145), *F. margarita* (p. 139), and some specimens of South African races of *F. lybica*.

An adult ♀ skull (19.7.7.3693), without skin, from Bakel, Senegal, also probably represents *bouvieri*, which Rochebrune recorded from Senegambia. Its measurements agree tolerably closely with those of the adult ♂ from Wady Natron, Lower Egypt, except that the zygomatic and postorbital widths are narrower and m_1 larger, less worn; the frontals between the eyes are flattened very much, as in the St. Vincent skull, but they are more swollen and prominent so that the slope of the nasals is still steeper, the temporal ridges are 16 mm. apart, the crests are better developed and the dentition is normal, although the teeth are small.

An adult ♀ skull from Last Hope Inlet, Chile, resembles the one from St. Vincent in the reduction of the inner lobe of pm^4, and it is further remarkable for the projection of the lower jaw beyond the upper and general lack of muscular moulding, the postorbital area and the cranium being exceptionally wide for a fully adult skull of its length.

Specimens in the Collection

Europe

16 skins	London (showing variation in colour and pattern)	R. I. Pocock [P]	28.7.13.1–15; 39.678
Mtd.	England—Chinchilla Persian	Mrs. L. B. Balding [P]	C 14
♂	Smoke Persian	W. F. Heath [P]	C 1
1	Blue Persian	Mrs. Herring [P]	C 9
1	India (England?) Blue Angora		37.6.10.39
1	England? Blue Persian		44.18
1	,, Russo-Persian (17 lb. in weight)	Miss E. Watts [P]	C 16
♂ mtd.	England? Brown Tabby Persian (*catus* pattern)	Sgt. S. Ingram [P]	C 3
Skull	England? New-born kitten	Yarrell [P]	56.12.10.1177
Skull	London	R. I. Pocock [P]	42.33
♀? skull	England	John Ray [P]	46.4.2.2
♂? ,,	,,	No history	46.5.11.9
♀? ,,	,, ?	Dr. Mantell [P]	41.1.14.46
Skull	,, ?	Purchased	127 n
2 skulls	,, ?	,,	127 o and p
3 ,,	,,	E. T. Newton [P]	
Skull	Dunkeld, Scotland	E. R. Alston [P]	79.9.25.82
,,	England, Manx-breed	Zoological Society [P]	127 r
♂ mtd.	Cornwall, Red and White Manx	Mrs. Collings and L. Hart Smith [P]	C 7

Mtd.	Isle of Man, White and Grey Manx	G. C. Bacon [P]	C 8
,,	England, White Manx	Miss T. S. Cochrane [P]	
♂	New Forest, England	P. H. Baker [C & P]	7.2.16.1
♂	Siamese breed, brought from India by Lord Curzon	Zoological Society [P]	44.21
Skin	London, Siamese breed	R. I. Pocock [P]	44.17
Mtd.	England?	Mrs. Windham Holley [P]	C 17
Skin	,,	W. K. Taunton [P]	C 20
♂	Siam	Morant [P]	91.10.16.1
2 skulls	France	F. Lataste [C & P]	19.7.7.1980, 2335
Skin	Hungary	Zoological Society [P]	1143.1
Skin	Luchon, Central Pyrenees	Rothschild Bequest	39.1661
,,	,, ?	,, ,,	39.1664
♂	No locality	,, ,,	39.1662
♂	Blair Atholl	Tetley Coll. [Purchased]	45.29

Asia and Australia

♂	Tiflis	Purchased	20.7.4.2
♂	Aden	Col. W. J. Yerbury [C & P]	95.6.1.61
	Lahej, Aden	A. B. Percival and W. Dodson [C & P]	99.11.6.33
♂	Seistan, East Persia	Calcutta Museum [P]	6.1.2.4
Skin	,, ,, ,,	Col. R. L. Kennion [C & P]	8.1.13.4
♀	Meshed, East Persia	Sir P. Sykes [C & P]	13.4.2.1
2 skin	Kandahar (Sir O. B. St. John)	Dr. W. T. Blanford [P]	91.10.7.14
♂	Djarkent, Turkestan (W. Rückbeil)	Hon. N. C. Rothschild	14.5.10.60
Skin	Tibet	B. H. Hodgson [P]	45.1.8.218
♂	Srinagar, Kashmir (Sir O. B. St. John)	Dr. W. T. Blanford [P]	91.10.7.12
2 ♂	Gopalpur, Kangra, 4,500 to 5,000 ft. (H. W. Wells)	Bombay Nat. Hist. Soc. [P]	44.1–2
Skin	Kumaun (E. R. Stevens)	Bombay Nat. Hist. Soc. [P]	44.15
1	Gangotri, Tehri Garhwal	Purchased	118a
♂	Pilibhit, Rohilkund (C. A. Crump)	Bombay Nat. Hist. Soc. [P]	44.14
1	United Provinces	R. St. G. Burke [C & P]	27.2.14.12
Skull	Nepal	B. H. Hodgson [P]	45.1.8.35
1	,,	B. H. Hodgson [P] Type of *F. inconspicua*	45.1.8.289
2 skulls	,,	B. H. Hodgson [P]	45.1.12.515–516
Skull	Katmandu	Mrs. H. A. Oldfield [P]	26.6.7.4
Skull	Sikkim	B. H. Hodgson [P]	58.6.24.145
1	,,	B. H. Hodgson [P]	58.6.24.53
♂	Hasimara, Bhutan Duars, 600 ft., *chaus*-type (N. A. Baptista)	Bombay Nat. Hist. Soc. [P]	16.7.29.40

♂	Angarakhata, South Kamrup, Assam, *chaus*-type (H. W. Wells)	Bombay Nat. Hist. Soc. [P]	21.7.8.19
♂	Dening, Mishmi Hills, 2,250 ft., *chaus*-type (H. W. Wells)	Bombay Nat. Hist. Soc. [P]	23.1.7.8
♀	Nimiaghat, Hazaribagh (C. A. Crump)	Bombay Nat. Hist. Soc. [P]	37.3.24.21
♂	Mogul Sarai, United Provinces	C. Stewart Betton [C & P]	6.6.15.1
♂	Sehore, Bhopal, Cen. India, 1,700 ft.	Capt. C. H. T. Whitehead [C & P]	9.6.12.12
♀	Sambhar, Rajputana (R. M. Adam)	A. O. Hume [P]	85.8.1.20
♂	Sukkur, Sind (S. H. Prater)	Bombay Nat. Hist. Soc. [P]	44.13
1	? India *ex* Indian Museum	Secretary of State for India [P]	79.11.21.288
2 ♂	Junagadh, Kathiawar (C. A. Crump)	Bombay Nat. Hist. Soc. [P]	44.3–4
♂	Bombay (imported by H. C. Brooke to England)	R. I. Pocock [P]	44.20
3 ♂ ♀	Kolar Town, Mysore (G. C. Shortridge)	Bombay Nat. Hist. Soc. [P]	13.4.11.44–47
1	Halery, North Coorg (G. C. Shortridge)	Bombay Nat. Hist. Soc. [P]	44.10
	Do. (Capt. W. J. E. Boys)	Purchased	48.8.14.4
1	"Domestic cat of India", *chaus*-type	Zoological Society [P]	55.12.24.263
1	India, *chaus*-type	A. D. Bartlett [P]	65.4.28.1
Mtd.	"Domestic cat of India", *chaus*-type	E. Blyth [P]	66.11.20.1
Mtd.	"Indian domestic cat", Mysore	Purchased	C 10
♂	Ambawela, Ceylon (E. W. Mayor)	Bombay Nat. Hist. Soc. [P]	44.27a
1	Yatiyantota, Ceylon (E. W. Mayor)	Bombay Nat. Hist. Soc. [P]	44.22
♀	Maymyo, Upper Burma (G. C. Shortridge)	Bombay Nat. Hist. Soc. [P]	44.11
♂	Paunggaung, N. Shan States (G. C. Shortridge)	Bombay Nat. Hist. Soc. [P]	44.9
♂	Toungoo, Lower Burma, *chaus*-type (J. M. D. Mackenzie)	Bombay Nat. Hist. Soc. [P]	44.7
Skins	Toungoo, Lower Burma, red *torquata*-type (J. M. D. Mackenzie)	Bombay Nat. Hist. Soc. [P]	44.8, 12
1	Toungoo, Lower Burma, tabby and white domestic cat (J. M. D. Mackenzie)	Bombay Nat. Hist. Soc. [P]	44.6
♀	Victoria Point, Tenasserim (G. C. Shortridge)	Bombay Nat. Hist. Soc. [P]	44.16
♀	North Luzon, Philippines (J. Whitehead)	Purchased	43.234a
Skin	Malaya	Charles Darwin [P]	68.2.19.118
♂ ♀	Amarassie, South-west Timor, 1,400 ft. (W. J. C. Frost)	Purchased	40.377–379

♂	Macassar, Celebes	A. R. Wallace [C]	57.8.6.1
Skins	,, ,, (W. J. C. Frost)	Purchased	34.7.24.1–2
♂	Rantekaroa, Quarles Range, Celebes, 6,600 ft. (W. J. C. Frost)	Purchased	40.376
	Tamalanti, West Celebes, 3,300 ft. (W. J. C. Frost)	Purchased	40.384
1	Bonthain Peak, South Celebes, 6,800 ft. (A. Everett)	Purchased	97.1.3.8
1	Rollingstone, 23 miles north of Townsville, Queensland (G. H. Wilkins)	Purchased	23.12.16.8
♀	Mount Driven, South Central Queensland	J. E. Young [P]	23.10.4.1
1	Annan River, Cooktown, Queensland (T. V. Sherrin)	F. du Cane Godman [P]	23.1.5.27
Skull	Tasmania	R. Gunn [C & P]	127 g

Africa

♂	Tunis	Sir Thomas Reade	55.12.24.257
♀ skull	St. Vincents, Cape Verde Is.	Purchased	58.4.8.3
♂	Egypt, type of *F. pulchella* and skin of kitten	Dr. Turnbull Christie [C & P]	165 a–b
1	Ber Victoria, Wady Natron, Lower Egypt	N. C. Rothschild [C & P]	3.8.1.1
♂	Meroe, Upper Nile	N. C. Rothschild [C & P]	4.11.3.13
♂ et juv.	Shendy, Sudan	N. C. Rothschild [C & P]	1.5.5.13–14
skull	Bakel, Upper Senegal	F. Lataste [P]	19.7.7.3693
1	Gold Coast	Capt. C. Armitage	44.26
2 ♂	Principe Is., Gulf of Guinea	Lt. Boyd Alexander [C & P]	11.6.12.13–14
Skin	Dangila, North-west Abyssinia	Major R. E. Cheesman [C & P]	44.27
	Fashoda, Sudan	R. M. Hawker [C & P]	1.8.8.21
	Lado, Sudan	Dr. Emin Pasha [C & P]	87.12.1.9
♀	Bulhar, Somaliland	Dr. R. E. Drake Brockman [C & P]	34.9.14.8
skull	Sokotra (Prof. Bayley Balfour)	British Ass. [P]	81.1.6.1
♂	Kilimanjaro, Tanganyika, 5,000 ft.	B. Cooper [P]	37.8.18.16
	Sibudeni, North-east Eshowe, Zululand, 3,590 ft. (C. H. B. Grant)	Col. A. Sloggett [P]	44.25
	Coguno, Inhambane, Portuguese East Africa (C. H. B. Grant)	Rudd [P]	6.11.8.43
1	British Bechuanaland	A. Pollard	37.9.4.1
1	Great Karas Mts., South-west Africa	G. C. Shortridge [C & P]	44.24
Skin	Machili R., Northern Rhodesia	D. Gordon Lancaster [C & P]	35.9.1.156
1	Voluma, Madagascar	Mrs. Cutter [Purchased]	70.5.5.38
Skin	Ankafana Forest, Betsileo, Madagascar	Rev. W. D. Cowan [C & P]	82.3.1.7

America

Skin	New Mexico	Purchased	57.6.22.1
♀ skull	Puerto Prat., Last Hope Inlet, Chile (Dr. J. F. Haegert)	J. A. Woolfssohn [P]	12.7.12.3

Felis silvestris, Schreber

1777. *Felis* (*catus*) *silvestris*, Schreber, Säugthiere, 3, p. 397, pl. 107a (Germany). Synonymy under subspecies.

Geographical Distribution.—Great Britain, France and Spain eastwards through Central and Southern Europe to South-west Russia, Asia Minor and the Caucasus.

Diagnosis.—Size medium for the genus, with the tail about half the length of the head and body, usually over but sometimes under, and almost invariably over twice the length of the hind foot. The coat is full, soft and long, about 50 mm., and thickened with wool; but there is no definite crest of longer hairs on the spinal area of the back, nor usually are the hairs on the tip of the ear sufficiently elongated to be called a tuft or pencil; the tail is bushy, cylindrical, not appreciably narrowed at its posterior end and its tip is broadly rounded.

Colour.—The general colour of the upper side of the body, excluding the pattern, varies from brownish to silvery grey in accordance with the tint of the generally extensive subterminal paler area of the contour hairs, which may be pale brown, buff-grey or bleached to nearly white, these hairs having a black tip above and a black area below the pale area, the base being white; the wool is pale grey at the base, almost always pale buff or ochreous at the summit, and this tint may appear on the surface when the contour hairs are disturbed. The backs of the ears are nearly uniformly coloured, greyish brown or brownish grey, sometimes with a faint ochreous or rusty wash and a trifle darker at the tip, but never very sharply contrasted in tint with the head; the muzzle and upper lip are rich buff, but there may be some whitish on the edge of the upper lip; the lower lip, chin and interramal area are white, and there is a whitish patch on the inner side of each eye. On the lower surface the throat behind the whitish interramal area and the chest are greyish, often tinged with buff, and there may be an albino patch varying in size and shape on the throat and another on the fore part of the chest; the hinder part of the abdomen in front of the genitalia is usually white to a varying extent, and this is surrounded by bright hairs ranging from buff to rich ochreous, these tints spreading over the inner and posterior surfaces of the thighs, the genital area and the basal part of the tail below. The upper side of the tail is like the back, except that the wool is generally black or grey throughout, without the buff tint, and the spaces between the terminal stripes are paler, greyish to nearly white above and below. The fore and hind legs are greyish or buffy, typically brighter and buffier on the paws and the soles of the feet round the pads are typically wholly black or blackish, this colour extending to the carpal pad on the fore foot and frequently up to the hock on the hind foot.

The pattern on the head consists of two cheek stripes, one rising from the corner of the eye and passing backwards beneath the ear, where it curves downwards, the other from the cheek below the eye and, following the same course, ceases close to the upper, but they do not pass on to the throat to form a collar behind the interramal area; sometimes there is an abbreviated stripe between these two in front and there is a patch or spot in front of the eye, and another just above it, whence the superciliary vibrissae rise. On the crown there are fundamentally five stripes, but these are often broken up into spots and confused, although two of them at least are distinct on the forehead above the eyes, where they abruptly cease. The median may be traceable, although narrow and discontinuous, over the nape and shoulders; but behind the shoulders it expands into a conspicuous black spinal stripe running to the root of the tail. The two pairs of lateral stripes on the head pass on to the nape, where they diverge and are thick and strongly emphasised; the inner pair may occasionally extend uninterruptedly backwards over the shoulders, but usually they are broken, so that two shoulder stripes are isolated and confined to that area, although they are sometimes traceable posteriorly as blotches or short stripes on each side of the spinal stripe; the outer pair either cease at the posterior end of the nape or, taking an outward curvature, are continued to the base of the fore legs. These dorsal, longitudinal stripes are more persistent than those on the sides of the body, which are generally less emphasised and may be evanescent, but are sometimes as sharply defined and, about a dozen in number, extend transversely or vertically from just behind the shoulder to the root of the tail, the three in front, of which the first runs to the fore leg, being complete and unbroken, whereas those on the hinder part of the body are more irregular and tend to be broken up more or less, giving a blotched, spotted or brindled pattern to this area, although where they pass on to the thighs and take an oblique direction down to the hocks they are typically better defined, and one or more of these may pass on to the inner surface of the thigh, almost encircling it; occasionally there are a few short stripes below the hock in front. The fore leg may have as many as six stripes on its outer side and two a little below the elbow extend on to its inner surface encircling the limb, the lower at least being broad and strongly pronounced, and the back of the upper part of the leg below the elbow may be heavily pigmented with black. On the under side a narrow transverse stripe may form a collar just behind the interramal area and sometimes there are traces of two similar juxtaposed stripes on the posterior part of the throat. The chest behind the fore legs may have a pattern of strong, irregular stripes continuous with those of the sides of the body, but usually these are broken up into spots which are sometimes so faint as to be scarcely detectable.

Skull.—The skull is short as compared with its width; the anterior or orbital portion of the zygomatic arches is salient, arcuate when viewed from above, and provided with a prominent thickening above and external to the infraorbital foramen. The bullae are of moderate size, their extreme length being much less than one-fourth the condylobasal length and much less than the length of the upper cheek-teeth; the occipital space between them is a little

narrower than their width and the inner chamber is noticeably larger than the outer. The cranial portion is wide, rounded and weakly moulded muscularly, the postorbital area being only slightly constricted and the sagittal crest usually restricted to its posterior portion, the temporal ridges in both sexes typically forming a lyrate area which reaches to or beyond the middle of the parietals; but the occipital crest is salient. In the teeth pm^2 is normally present and pm^4 has the inner lobe (protocone) well developed. Some variations in the skull and teeth are described under the subspecific headings.

CHARACTERS.—Individual skins show considerable variation in colour and distinctness of pattern. Two from France are strongly contrasted. One from Selanon, Haute Marne (95.11.9.2), February 5, with the coat about 50 mm. long, has a pronounced silvery grey cast, the stripes on the head, nape, shoulders and spine are strong and black, but the lateral stripes are weaker, and rather obscure, although more pronounced on the legs; the spots on the chest are strong; the abdomen is buffy and the tail is grey with four distinct stripes, three forming complete rings; the hind foot is brown below the hock. One from Mouladier Forest, near Moulins, Allier Province (19.7.7.3646), no date, has the coat about the same length and is probably an early winter skin, the colour above being yellowish brown without any greyish white in the contour hairs; the dorsal stripes are distinct and black, but those on the flanks and outer side of the fore leg are obsolete, those on the thighs obscure and on the chest fuscous; the abdomen is ochreous, the tail buffy with two strong stripes; the hind foot is black to the hock.

One from Manonville, Meurthe-et-Moselle (95.11.9.1), February 25, has the coat about 57 mm. and closely matches the skin from Selaron in ground tint, but is not quite so silvery, has the pattern on the sides and thighs weaker, with scarcely a trace of them on the outer side of the fore leg and the spots on the chest are almost obliterated; the tail has only two complete rings and the hind foot is buff below the hock, and the black on the sole is relieved by a white patch in front of the plantar pad. One from Caterille, Haute Garonne (8.7.15.1), January 15, with the coat about 53 mm., is nearly intermediate between the darker Mouladier skin and the two "frosted" French skins above described; the lateral pattern is hardly traceable, on the fore leg and thighs it is faint, but stronger close to the hock; the tail is about as in the Mouladier skin, the abdomen is rich ochreous and the chest-spots are strong and black; but the hind foot is yellowish brown below the hock, black about the pads.

One German skin from near Ingelheim, in Hessen (11.1.2.104), is silvery, like the first described two skins from France, and the tail is pale grey; the lateral stripes are brown and rather faint, but those on the thighs are stronger, and on the outside of the fore legs visible; spots on the chest are large and black, and the hind foot is greyish brown below the hock. A skin from North Germany (95.5.1.1) is an exact match of the one from Caterille, but the wool is paler buff at the summit, there is less ochreous on the abdomen, and the tail has three complete black bands.

Two male skins (Rothschild Bequest, 39.1659–60) from Luchon, on the northern slopes of the Central Pyrenees, dated February 9, 1906, have

the coat full and long, 50 mm. on the spine, 35 mm. on the flanks and 45 mm. on the tail. The stripes on the nape, shoulders and spine are well defined and black, as are those on the legs; but the flank stripes are indistinct, giving a brindled effect. They closely resemble the skin from Caterille, dated January 15; but are not so grey and bleached as the skin from Selaron, killed on February 6.

Felis silvestris silvestris, Schreber

1777. *Felis silvestris*, Schreber, Säugthiere 3, p. 397, pl. 107 a (Germany).
1777. (*Felis catus*) *ferus*, Erxleben, Syst. Regni Anim., 1, p. 518.
1857. *Felis catus*, Blasius, Säugethiere, p. 162, and many subsequent authors, including Elliot, Mon. Felidae, pl. 30, 1876–83; Lydekker, Cats, Allen Nat. Library, p. 170 (1895); Hamilton, The Wild Cat of Europe, 1896 (not *Felis catus*, Linnaeus, see *ante*, p. 6).
1863. *Catus ferus*, Brehm, Illustr. Thierleben, 1, p. 275 (Germany).
1896. *Catus ferox*, Martorelli, Atti. Soc. Ital. Sci. Nat., Milano, 35, p. 253 (January) (Germany).
1907. *Felis silvestris*, Pocock, Proc. Zool. Soc., p. 150; Trouessart, Faune Mamm. d'Europe, 1910, p. 98.
1912. *Felis silvestris silvestris*, Miller, Cat. Mamm. Western Europe, p. 462; Ognev, Zeitschr. Säugetierk., 5, p. 53, 1930; *ibid.* Mamm. U.S.S.R., 3, p. 120, 1935; Pocock, Jour. Linn. Soc., Zool., 39, p. 7, 1934.

Geographical Distribution.—Central Europe from France, Northern Spain and Italy in the west eastwards into South-west Russia, the western shores of the Black Sea, and probably Greece.

Colour.—Two undated skins from Burgos, North Spain, agree closely with those from Luchon, and with German skins. A ♂ (8.7.7.11), with the coat about 47 mm. long, is silvery almost, as in the skin from Ingelheim, but has the stripes on the sides of the body and the fore and hind legs more distinct, those on the sides being brown and much paler than the strong black dorsal stripes; the spots on the chest are black and the tail has three well-defined stripes. A ♀ (8.7.7.10) is not so silvery as the ♂, almost exactly matching the skin from North Germany, but has the pattern on the chest more pronounced and more black on the base of the fore leg and on the hock.

Measurements of Skins

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*
			in.	in.	in.
♂ ad.	Burgos, North Spain	(*vide* Cabrera)	23½	10⅝	4⅝
♂ yg.	Caterille	8.7.15.1	19⅝	10⅝	4⅛
♂ ad.	North Germany	95.5.1.1	21⅛	12⅝	5⅝
yg.	Rheinhessen	11.1.2.104	19⅛	12⅝	4⅛

It is to be noticed that in the three specimens in the British Museum, which were measured in the flesh, the tail is considerably more than half the length of the head and body and the hind foot about one-fourth the length, a little more or less, whereas in Cabrera's specimen the tail is a good deal less than half and the hind foot much less than one-fourth the length of the head and body. This suggests that Cabrera's measurements were taken from a dried skin, mounted or flat, in which the head and body were more stretched than the tail and foot, a very usual result of that method of preservation.

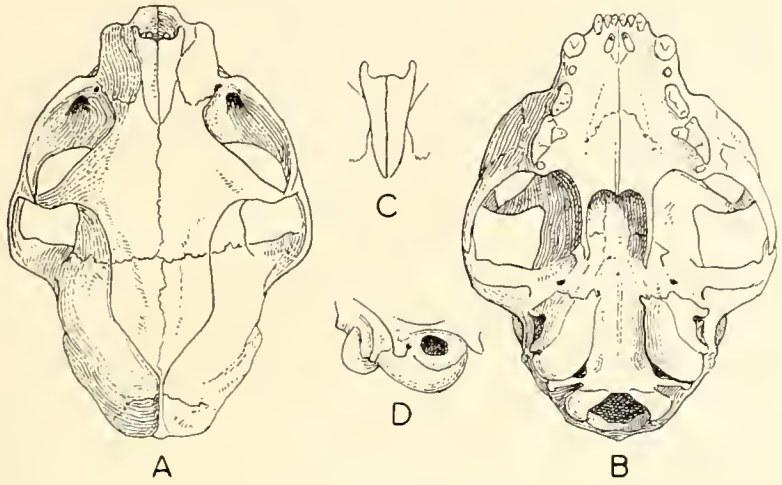

FIG. 1.

Felis silvestris silvestris

A & B.—Upper and Lower view of skull of adult ♂; Tübingen, S. Germany.
C.—Nasal bones not foreshortened.
D.—Side view of right auditory bulla.

SKULL.—The variations in the available skulls, allowing for such as arise from age and sex, are comparatively slight. The highest point of the cranium lies as nearly as maybe at the level of the posterior edges of the frontal post-orbital processes where the inflation with air-cells is greatest. The inflation varies individually and is greatest in the skull from Mouladier Forest, near Moulins (19.7.7.3645). The extent of the inflation where the frontals abut against the maxillae and nasals and the consequent steepness of the shape of the median part of the nasals also vary to a certain amount; but none of the skulls shows the marked prominence of this area so commonly developed in domestic cats both tame and feral. The temporal ridges always form a more or less lyrate area which is narrowest, 16 mm. wide, at the suture in the above quoted skull from Mouladier, which is younger than the male skull from South

Skull and Tooth Measurements of *Felis silvestris silvestris*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla (length and width)*	*Mand. length*	pm^4	m_1
♀ ad.	Burgos, North Spain	8.7.7.10	87	81	61	43	34	17	21	20 : 14½	58	11	8
♂	Luchon Province, France	39.1660	103	—	74 +	46	35	—	24	—	68	11	9
♂	Luchon Province, France	39.1659	100	—	67	44	35	19	24	—	64	11	8
♂	Near Moulins, France	19.7.7.3645	97	89	69	45	34	20	25	19 : 14	64	11	8
♂ ad.	,, ,, ,,	19.7.7.2901	94	89	67	45	34	19	25	19 : 15	63	11	8
♂ ad.	Meurthe-et-Moselle.	95.11.9.1	—	—	66	43	33	18	22	—	62	11½	8½
♂ yg.	Caterille, Haute Garonne	8.7.15.1	87	80	60	46	34	17	22	18 : 14	55	11	8
♂ ?yg.	Selaron, Haute Marne	95.11.9.2	—	—	59	44	36	16	21	—	56	11	8
—	South Germany .	1143 f	95	87	70	46	36	19	24	18 : 15	62	—	8
—	,, ,, .	1143 d	93	85	67	44	34	18	23	19 : 16	61	11	7½
Young	Rheinhessen, Germ'y	11.1.2.104	—	—	66	43	35	17	19	19½ : 14	55	10½	7½
♂ ad.	Tübingen, South Germany . .	20.7.4.32	95	90	69	46½	36	20	26	18 : 15	64	11½	8
♀ ad.	Thuringia, Central Germany . .	(*vide* Ognev)	87 —	80	60½	38½	31	17	—	20 : 14	—	10	8 —
♂ ad.	Baranza, Hungary (pure bred?) .	2.6.3.1	103	96	72	42	27	18	27	19 : 14½	70	11½	8
♂ ad.	Varna, Bulgaria .	(*vide* Anderson)	—	95	72 +	—	35 —	21 —	27 —	—	68	—	—

Germany (1143 f), in which the area is 21 mm. wide. In the latter also the sagittal crest on the interparietal is low, only 1 mm. high, and the postorbital processes are massive and almost in contact, whereas in the Mouladier skull the crest is 3 mm. and the postorbital processes are not so massive and are more widely separated. The nasals are variable in width and length. In the skull from Meurthe-et-Moselle (95.11.9.1) their median length is 23 mm. and their least width at the frontal points is 5 mm.; in the skull from the Mouladier Forest, near Moulins (19.7.7.2901), the same dimensions are 25 and 7 mm., and in one from South Germany (1143 d) 20 and 6 mm. In the last they do not overlap the maxillae, whereas in the others the overlap is considerable, as is usually the case, and as a rule there is no marked constriction, such as is seen in 95.11.9.1.

As regards general size, the two imperfect skulls from Luchon, considered to be ♂, are larger than any from Western Europe, especially the first, which probably had a condylobasal length equalling that of the skull from Varna.

The adult ♂ skull from Baranza, in Hungary, figured by Hamilton (*The Wild Cat of Europe*, p. 50, 1896) as a representative of the European species, is entered in the table of measurements because Miller assigned it, without comment, to *F. s. silvestris*. But it differs in several points from all the other skulls assigned to that race. It is exceptionally long, especially in the muzzle, and narrow, its condylobasal length considerably exceeding that of all the others except the one from Varna, which I have not seen, and its postorbital width is much less. This last character, associated with its narrow, rugose cranium, is accompanied by a complete sagittal crest extending from the fronto-parietal suture, as in one of the skulls of the Spanish race (see below, p. 43), and an occipital crest more salient than in the other skulls, in which the temporal ridges form a sublyrate area not less than 11 mm. wide, as it is in the skull (19.7.7.3645) from near Moulins, the sagittal crest being restricted to the posterior slope of the upper surface. In 1934 I ignored this skull as being that of a domestic cat or possibly of a wild cat reared from early cubhood in captivity;[1] and the same course is here followed.

Specimens in the Collection

♂ ♀	Burgos, North Spain (S. and G. Gonzalez)	Purchased	8.7.7.10–11
2 ♂	Luchon, Pyrenees, France	Rothschild Bequest	39.1659–60
2 ♂	Forest of Mouladier, near Moulins, France	F. Lataste [P]	19.7.7.3646, 2901
♂	Caterille, Haute Garonne (H. Robert)	O. Thomas [P]	8.7.15.1

[1] Evidence in favour of this conclusion is supplied by the mandible which will not balance upright on a flat surface on its postdental portion. In this it resembles the mandible of over 90 per cent of domestic cats. In the wild cat, on the contrary, the mandible stands in that position. This difference, first pointed out to me by Heneage Cocks, who had implicit faith in the test, is due to the more backward slope of the coronoid in domestic cats. On p. 462 of his *Mammals of Western Europe*, Miller figured the mandibles of the domestic and wild cats to show this difference; but the legend of the illustration should be transposed, the upper figure being the mandible of *F. catus* and the lower that of *F. silvestris*. This backward slope of the coronoid is a common feature in menagerie-reared Carnivora.

♂	Manonville, Meurthe-et-Moselle, Lomont Mountains	Dr. E. Hamilton [P]	95.11.9.1
♂?	Selaron, Lomont Mountains, Haute Marne	Dr. E. Hamilton [P]	95.11.9.2
1	Near Ingelheim, Rhenhessen, Germany		11.1.2.104
♂	North Germany	Lord Lilford [P]	95.5.1.1
2 skulls	South Germany	Dr. A. Gunther [P]	1143d and 1143f
♂	Kirnbergwald, near Tübingen	Purchased	20.7.4.3
♀ skull	Baranza, Hungary (reared in captivity)	Dr. E. Hamilton [P]	2.6.3.1

Felis silvestris grampia, Miller

1907. *Felis grampia*, Miller, Ann. Mag. Nat. Hist., 7th series, 20, p. 396 (Invermoriston, Inverness, Scotland); Trouessart, Faune Mamm. d'Europe, p. 99, 1910.

1912. *Felis silvestris grampia*, Miller, Cat. Mamm. Central Europe, p. 464, Pocock, Journ. Linn. Soc. Zool., 39, p. 1, 1934. *id.* The Scottish Naturalist, 1934, p. 36; Tetley, Proc. Zool. Soc., ser. B, 3, p. 13, 1941.

Geographical Distribution.—Formerly throughout Great Britain, now restricted to the wilder parts of Scotland north of a line between Glasgow and Dundee.

Diagnosis.—Distinguished on the average from the typical Central European race (*F. s. silvestris*, p. 32) by its slightly larger size, darker ground colour and more pronounced pattern.

Measurements.—Comparatively few of the specimens in the Museum were measured in the flesh, but Tetley gave the dimensions of nine adult ♂♂ and six adult ♀♀, mostly from Perthshire, which agree very closely with those enumerated below. His largest two ♂♂ have the head and body and tail $25\frac{2}{5}+12\frac{1}{5}$ and $25\frac{1}{5}+14\frac{1}{5}$ inches slightly exceeding the ♂ from Ardgay, the same dimensions in his smallest, an old ♂, being $23\frac{1}{5}+13\frac{1}{5}$. His largest ♀ is $22\frac{3}{5}+12$ and his smallest $20\frac{3}{5}+10\frac{1}{5}$. As regards weight the ♂ from Ardgay is the heaviest recorded, the second being one of $15\frac{1}{2}$ lb. mentioned by Kirk. Tetley's ♂♂, with one exception, vary from 11 to 15 lb., the exception being a very thin specimen of $7\frac{1}{4}$ lb. The average weight of his normal ♂♂ is about 12 lb. His ♀♀ vary from $6\frac{3}{4}$ to $10\frac{1}{4}$ lb., the average being about $8\frac{1}{2}$ lb.

Colour.—Colour on the average darker and the pattern on the flanks and limbs better defined, than in the typical Central European race, the stripes on the legs and spots on the ventral surface never so nearly evanescent and the transverse stripes on the throat, not conspicuous in any of the examined skins of that race, very commonly present and often well defined. The coat a little longer and fuller than in the Southern Spanish race, the colour on the average a little darker, but the pattern about the same, except that the throat "collars" are not developed in the few available skins of *tartessia*.

Skull.—The skull a little longer on the average than in *F. silvestris silvestris*,

with the teeth about the same size; but a little shorter than in *F. silvestris tartessia* with the teeth a little smaller.

Remarks.—Individual variations in the colour and pattern were pointed out by myself in 1934 and by Tetley in 1941. Hence it is only necessary to deal now with a few out of the large number of skins in the British Museum. One from the Ardnamurchan, Argyllshire (37.6.10.1), May 22, is as silvery as any of the skins of typical *silvestris*, closely matching in this respect those skins of the latter from Selaron, in France, and Testemel, in Dobrudscha, but with the lateral pattern much stronger. Two other skins come near it in silveriness, namely one from Glencassley, Sutherlandshire (92.10.21.1), and one from Glenmoriston (20.9.24.1), September 13. The dates of this skin and of the one from Ardnamurchan suggest that the "frosting" is not a seasonal feature. Other

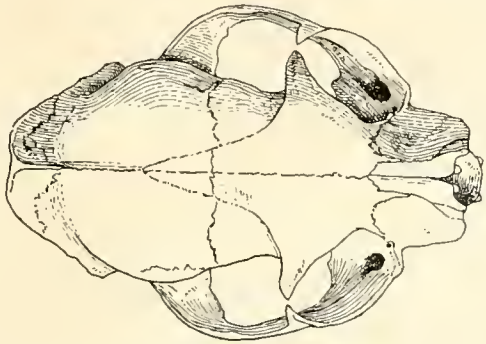

Fig. 2.

Upper view of skull of adult ♂ *Felis silvestris grampia* from Ardgay, Ross-shire.

skins show every graduation in the tint of the subterminal pale area of the contour hairs from white to ochreous brown. In the latter case the colour may very closely resemble that of the darkest skin of typical *silvestris* from the Mouladier Forest (19.7.7.3646). A skin from Inverness-shire (33.1.17.1) is unusual for having the chin and area between the lower jaws rich ochreous and the whole throat ochreous grey apart from an albino spot. This area from the chin backwards varies from that tint to nearly wholly white.

The dorsal pattern is always strongly pronounced, as in the other races; but the skin above referred to from Ardnamurchan is peculiar in that the two pairs of stripes on the crown are continued posteriorly as comparatively narrow, juxtaposed lines along the nape to the shoulders, the median pair running without interruption over the shoulders to the anterior part of the back. The stripes on the sides of the body may be very faint and are nearly always browner than the black dorsal pattern; but they are commonly well developed, and in a skin from Dundonnell (16.11.27.3) they are very nearly as black as the dorsal pattern. The skins, with heavily marked lateral pattern, closely resemble those

of the South Spanish race *F. silvestris tartessia*. On the other hand, skins with the lateral pattern faint, as in a ♂ from Achnacarry, Inverness-shire (25.7.7.1), in which it is obscure and detectable only as indistinct brindling, are like most of those of the typical Central European race *F. silvestris silvestris*; and, as in the colour, there is every gradation between the extremes in the distinctness of the pattern.

MEASUREMENTS AND WEIGHTS OF *FELIS SILVESTRIS GRAMPIA*

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*	*Weight*
			in.	in.	in.	in.	lb.
♂ ad.	Ardgay, Ross	34.1.6.1	25	14⅝	5⅛	2⅛ +	15⅝
♂ ad.	Glenmoriston, Inverness	26.9.24.1	23½	13	5⅜	2⅛	13½
♂ ad.	Beauly, Inverness	29.11.4.1	22⅛	12	5⅛	2⅜	—
♀ ad.	Dunkeld, Perthshire	45.352	22½	12⅜	5	2½	8½
♀ ad.	Aberdeenshire	4.1.25.4	21⅝	11⅜	5	2⅛	—
♀ ad.	Dundonnell, Ross	16.11.27.1	20⅜	12⅝	5⅛	2⅜	—
♀ ad.	,, ,,	16.11.27.3	20	12⅜	5⅛	2½	—
♀ ad.	,, ,,	16.11.27.2	19⅛	13⅝	5	2⅜	—
♀ ad.	Braulen Forest, Inverness-shire	6.12.18.1	20⅛	11	4⅛	2⅝	—

SKULL.—As in other races of the species, ♂ skulls are longer and wider than ♀ skulls on the average, and have slightly larger teeth. In adult ♂ skulls the condylobasal length ranges from 88 to 99 mm., the average in many specimens being about 93 mm. In adult ♀ skulls the same dimension varies from 82 to 88 mm., the average of many being 85 mm. In youngish ♂ skulls the temporal ridges are faint and define a wide lyrate area about 20 or more mm. apart at the fronto-parietal suture. In older or old skulls the area is narrower, the ridges stronger and from 15 to 12 mm. apart at the suture, and meet behind on the posterior half of the parietals. They meet at that point in an adult ♂ in Tetley's collection (45.44) from Killihangie, and in an old ♂ (45.47) from Calvine, Perthshire. In the latter, which has the teeth worn, the ridges are 12 mm. apart, in the former the distance is 15 mm. In ♀ skulls the ridges resemble those of the younger adult males. In both sexes the sagittal crest is a low ridge restricted to the occipital area. The nasal bones are almost always wide with evenly convergent edges, but they may be constricted, as in a ♀ from Ben Ghormaig (Tetley's collection, 45.36). The posterior ends of these bones usually extend beyond the upper ends of the maxillae, up to 6 or more mm.; but they are occasionally level with them or even a little behind.

The teeth vary a little in size and number. In the upper jaw pm^2 is usually retained,[1] but may be lost in old animals. In the lower jaw a minute pm_2 is occasionally present.

[1] An additional small premolar, judged to be pm^1, was recorded by me in a skull from Ross-shire (*Ann. Mag. Nat. Hist.*, 18, p. 272, 1916).

Skull and Tooth Measurements of *Felis silvestris grampia*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	pm^1	m_1
♂ ad.	Ardgay, Ross . .	34.1.6.1	106	99 ±	76	50	37	22	28	19½ : 15	71	11	8
♂ ad.	Beauly, Inverness .	29.2.27.2	102	93	74	47	33	22	27	20 : 15	68	11	8
♂ ad.	,, ,, .	29.11.4.6	98	91	70	—	33	20	25	19 : 14	67	11	8
♂ ad.	Glenmoriston, ,, .	20.9.24.1	102	95	73	47	35	20	25	19 : 15	69	11	8½
♂ ad.	Ardgour, Argyllshire	34.6.28.15	96	89	69	46	33	18	26	19 : 14	65	10	7
♂ ad.	Inchnadamph, Sutherland	79.9.25.81	96	89	68	48	35	19	25	20 : 15	—	11	—
♂ yg. ad.	Invermoriston, Inverness-(type)	4.1.25.3	94	88	64	48	34	18	24	19 : 15	62	10	7½
♀	Sutherland . .	—	95	88	71	45	33	20	26	18½ : 15	65	11½	7
♀ yg. ad.	Dunkeld, Perthshire	45.352	95	88	66	46	33	19	24	18 : 13	61	—	8
♀ ad.	Fort William . .	99.2.9.1	92	84	64	44	33	17	24	18 : 14	—	10½	—
♀ ad.	Ben Nevis, Inverness	1937.12.11.3	91	85	67	46	34	18	24	17 : 14	60	10	7
♀ yg. ad.	Invermoriston, Inverness	4.1.25.5	90	83	64	44	35	18	23 ±	18 : 13	60	10	7
ad.	Arisaig, Inverness .	2.6.3.4	94	86	68	46	32	18	24	18 : 15	64	11	7

Specimens in the Collection

2 skulls	Sutherland	E. T. Newton [P]	
♂	Glencassley, Sutherland	Lady W. H. Flower [P]	92.10.21.1
Skull	Inchnadamph, Sutherland (J. A. Harvie Brown)	E. R. Alston [P]	79.9.25.81
2 skins	Loch Carron, Ross	Zoological Society [P]	39.667, 668
3 ♂	Dundonnell, Ross	Miss Firth [P]	16.11.27.1–3
♂, ♀	,, ,,	,, ,,	30.2.17.1–2
♂	Ardgay, Ross	Sir R. W. Brooke [P]	34.1.6.1
3 ♂	Beauly Dist., Inverness-shire	Sir Lionel Fletcher [P]	29.2.27.1–2
	,, ,, ,,	,, ,,	29.11.4.1
1	Guisachan, Beauly, Inverness.	Lord Tweedmouth [P]	5.10.12.1
2 ♂, 1 ♀	Knock Fin, Beauly River, Inverness-shire	Col. R. Stephenson Clarke [P]	23.4.4.1–3
♂	Invermoriston, Inverness-shire	A. H. Cocks [P] (type of subspecies)	4.1.25.3
2 ♂, 1 ♀	,, ,,	,, ,,	4.1.25.2,5
♂ mtd.	,, ,,	Hon. N. C. Rothschild [P]	1.5.22.4
♂	Glenmoriston, ,,	A. L. Marriott	20.9.24.1
1 ♂, 2 ♀, 4	,, ,,	Col. J. Hamilton Leigh [P]	34.6.28.33,35,37, 38–40,43–44
3 skulls	Ben Nevis, Inverness-shire	Dr. E. Hamilton [P]	1937.12.11.1–3
	Lochailort ,,	Kenneth Macdonald [P]	35.12.4.1
Mtd.	Braulin Forest, ,,	J. E. Harting [P]	83.11.3.1
♀	Braulin Forest, ,,	G. W. Henderson [P]	6.12.18.1
2 ♂	Knoydart, ,,	Sir Herbert Maxwell [P]	98.12.26.1
	,, ,,	,, ,,	99.2.9.1
Skull	Arisaig, ,,	Dr. E. Hamilton [P]	2.6.3.4
♂	Achnacarry, ,,	Cameron of Lochiel [P]	25.7.7.1
2 ♂	Inverness-shire	Purchased	33.1.17.1
	,,	,,	32.3.10.1
Yg. mtd.	Ardnamurchan, Argyllshire	Rothschild Bequest	39.3651
	Glenerispdale, ,,	E. Baker [P]	38.8.5.1–5
♀	Strontian, ,,	Col. J. Hamilton Leigh [P]	34.6.28.41
2 ♂, 2 ♀	Inversanda, Ardgour, Argyll.	Col. J. Hamilton Leigh [P]	34.6.28.43–46
♀ 2 juv.	Ben Ghormaig, Morven, ,,	Tetley Coll. (Purchased)	45.36–7
	Glen Caledon, Braemar, Aberdeenshire (H. S. Foljamb)	Purchased	51.10.4.90.
	Aberdeenshire	A. H. Cocks [P]	4.1.25.4
	Glen Shee, Perthshire	Sir M. Ramsay [P]	28.4.1.1
4 ♂, 2	Killiehangie, Ballinluig, Perthshire	Tetley Collection (Purchased)	45.45–46,48–51
♂	Calvine, Perthshire	Tetley Coll. (Purchased)	45.47
♂	Dunkeld, ,,	W. S. Roy	45.352
1 ♂, 2	Cluniemore, Pitlochry, Perth.	Tetley Coll. (Purchased)	45.19–21
	Balnakeill, ,, ,,	,, ,, ,,	45.53
3 ♂	Bonskeid, ,, ,,	,, ,, ,,	45.40–42
♀	Fonab, ,, ,,	,, ,, ,,	45.35
2 ♂, 1 ♀	Ben Vrackie, ,, ,,	,, ,, ,,	45.43–44,52
1 ♂, 2	Fincastle, ,, ,,	,, ,, ,,	45.54–56
	Boremch, Loch Tummel ,,	,, ,, ,,	45.18
	Loch Tummel ,,	,, ,, ,,	45.17

6 ♂, 1 ♀	Blair Atholl, Perth	Tetley Coll. (Purchased)	45.22–28
3 ♂, 2 ♀	Glen Tilt, Blair Atholl, ,,	,, ,, ,,	45.30–34
Mtd.	Dumfries	Sir W. Jardine ,,	86.7.2.13
1 mtd.	Scotland	Rothschild Bequest	39.3652
,, ,,	Scotland	Col. R. Shoolbred [P]	33.1.16.1
Mtd.	Fort William, Inverness-shire	Purchased	24.12.16.4

Felis silvestris tartessia, Miller

1907. *Felis tartessia*, Miller, Ann. Mag. Nat. Hist., 7th ser., 20, p. 397, November (Coto Doñana, Huelva, South Spain); Trouessart, Faune Mamm. d'Europe, p. 99, 1910.

1912. *Felis silvestris tartessia*, Miller, Cat. Mamm. Western Europe, p. 465; Pocock, Journ. Linn. Soc. Zool., 39, p. 3, 1934; *id.* The Scottish Naturalist, 1934, pp. 36–9.

Geographical Distribution.—Southern Spain.

Diagnosis.—Distinguished from *F. s. grampia* and *F. s. silvestris* by its shorter, thinner winter coat and larger skull and teeth, and also from the latter by the more strongly pronounced lateral pattern, but resembling well-marked examples of the former in this respect. The skull and teeth are about the same size as in many examples of *F. s. caucasica*; but the colour is much clearer grey and the pattern stronger than in that race.

Colour.—Only three skins certainly belonging to this race are available, and they differ slightly individually. One (8.3.8.1) from Coto Doñana, undated, is probably a summer skin judging from the coat which is thinnish and short, the hairs on the flanks being about 35 mm. and on the crest 45 mm. long. The pale speckling of the contour-hairs on the flanks is buff grey and not extensive owing to the shortness of the coat; the wool on the flanks is clear buff at the summit, on the spine it is duller, deeper buff, darkening towards the shoulder; the dorsal pattern is strong and black, the four stripes running from the head to the nape nearly reach the two on the shoulder and are traceable down the spine as closely juxtaposed bands which gradually lose their distinctness towards the base of the tail; the lateral stripes are also conspicuous, but less so than the dorsal, owing to being diluted with pale buff speckling; on the legs externally the pattern is stronger than on the flanks and is continued to the paws; the chin and fore throat are dirty white, the hind throat palish grey, the chest and abdomen buff, oversprinkled with white, and the insides of the thighs are ochreous to the hocks; the pattern on the chest is strong and black, but the throat-collars are almost obsolete.

The type (7.6.4.1), from Coto Doñana, probably killed a little later in the season than the last, has the coat slightly longer and fuller, is a little clearer grey, with the wool everywhere rather duller in tint; the dorsal pattern is nearly the same, but the median stripes on the neck are more widely separated from the shoulder stripes; the pattern on the flanks, legs and below is not so strong, and the chest and belly are not so buff and are more extensively oversprinkled with white.

SKULL AND TOOTH MEASUREMENTS OF *FELIS SILVESTRIS TARTESSIA*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	pm^4	m_1
			mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Coto Doñana, Huelva	8.3.8.1	111	105	80	47	32	22	31	$21\frac{1}{2}$: ?	(72 +)	12	–
♂ ad.	,, ,, ,, (type)	7.6.4.1	107	(101)	76	45	32	21	28	24 : 18	69	12	9
♂ ad.	Andalucia . .	2.6.3.2	103	(98 ±)	71	46	28	19	27	19 : 13	—	12	—
♂ yg. ad.	Sierra Morena .	7.12.5.1	—	(96 ±)	73	45	32	19	26	—	67	11	$9\frac{1}{2}$
♂ ad.	Madrid . . .	(*vide* Cabrera)	—	92	78	—	$34\frac{1}{2}$	21 +	—	—	69	—	—
♀ ad.	Andalucia . .	2.6.3.3	—	86 ±	73	43	31	15	25	18 : 12	60	12	$9\frac{1}{2}$

The third skin (7.12.5.1), from the Sierra Morena, marked winter, has the coat fuller and longer than in the first described specimen, the flank-hairs being about 42 mm.; the general colour above is noticeably clearer grey, the wool on the flanks is duller buff than in either of the preceding two, and that of the spine is much darker, mostly sooty brown with a buffish tint only over the loins; the lateral and ventral pattern is almost as in the type, that of the nape and shoulders more as in the first described. The differences between 7.12.5.1 and 8.3.8.1. in the tints of the flanks and of the wool probably indicate the normal seasonal differences that occur in this race.

No flesh measurements are available.

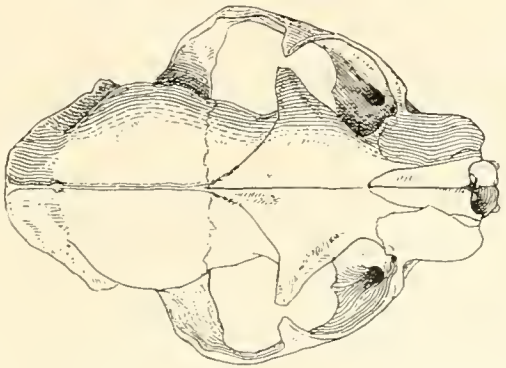

Fig. 3.
Skull of adult ♂ of *Felis silvestris tartessia* from Coto Doñana, S. Spain.

Skull.—The skull of a topotype, an oldish ♂ from Coto Doñana (8.3.8.1), is exceptionally well developed not only in length, but in muscular moulding. The temporal ridges meet at the obliterated fronto-parietal suture and behind that point there is a definite, but low sagittal crest,[1] about 1 mm. high, rising to 4 mm. posteriorly, where it joins the prominent occipital crest; the postorbital area is constricted and the zygomatic and maxillary widths, especially the latter, are large. The highest point of the skull, as in typical *silvestris*, is on a level with the posterior edges of the postorbital processes, where there is marked air-cell inflation; the nasals are unconstricted and the orbital rings are incomplete.

The skull of the type (7.6.4.1), also ♂, although fully adult is not so old as the last and is smaller. The temporal ridges are 10 mm. apart at the suture and meet in the centre of the parietals; the frontals between the postorbital processes are not so inflated, the anterior nares are narrower, 12 mm. as compared with 15 mm., but the bullae are a little longer.

An adult ♂ skull from Andalucia (2.6.3.2) is smaller than the preceding, and

[1] The only other skull of the species with a similar sagittal crest is the one from Baranza, Hungary (2.6.3.1.), discussed on p. 35.

although the temporal area is narrower, only 7 mm. wide at the suture, the posterior sagittal crest is lower, only 3 mm., and the occipital crest is much less salient than in the type and in the topotype. A skull from Sierra Morena (7.12.5.1) has the zygomata slightly wider than in 2.6.3.2, but is evidently younger by its wider postorbital area and temporal ridges 13 mm. apart. The skull (2.6.3.3) from Andalucia is adult. It differs from the ♂ skulls by its much smaller size, smaller postorbital processes, wider postorbital and temporal areas, the ridges of the latter being 18 mm. apart. Its teeth are about the same size as in the ♂♂, except the canine, which has a basal thickness of 5 mm. instead of 6 mm. in the ♂♂.

Specimens in the Collection

♂	Coto Doñana, Huelva, Andalucia, S. Spain (B. F. Buck)	Abel Chapman [P]	7.6.4.1 type
♂	Coto Doñana, Huelva, Andalucia, S. Spain (B. F. Buck)	Abel Chapman [C & P]	8.3.8.1
♂	Sierra Morena, north of Palma del Rio	Abel Chapman [C & P]	7.12.5.1
1 ♂, 1 ♀	Andalucia (Howard Saunders)	Dr. E. Hamilton [P]	2.6.3.2–3
1	Spain	Zoological Society [P]	39.670

Felis silvestris molisana, Altobello

1912. *Felis silvestris silvestris*, Miller, Cat. Mamm. Western Europe, p. 463 (in part, skins from Rome).

1921. *Felis molisana*, Altobello, Fauna dell' Abruzzo, Mamm., p. 55 (Molise, Italy); *id.* Monitore Zool. Ital., 35, Rendiconti, etc., p. 35, 1924; Pocock, Journ. Linn. Soc. Zool., 39, pp. 10–11, 1934.

Geographical Distribution.—Central Italy, Abruzzo, Molise, and Campania.

Characters.—This race may be provisionally admitted on the evidence of a skin[1] from Rome in the British Museum which differs from the other European races, in the combination of a few particulars.

Colour.—The coat is short, about 40 mm. long, only moderately thick, and smoother; the ground colour is dull, darkish grey, finely and closely speckled with paler buffy grey and quite lacking the bolder speckling typical of the other races when it is developed; the stripes on the head, nape and spine are strong and black, but the two stripes on the shoulders are unusually faint; the lateral pattern is also faint, browner than the grey ground tint, but the stripes above the hocks and on the fore leg are rather better defined, and the chest pattern is strong.

The short coat, dull tint, fine pale speckling and indistinct shoulder stripes are the most striking features of the skin; but it does not agree with Altobello's

[1] According to Miller there were two skins in 1912. These he referred to as apparently identical with more northern specimens. In 1934 I stated that the single skin then available differs from those of typical *silvestris* only in the indistinctness of the shoulder stripes. This was an error, there being other differences as well.

skins, which are said to differ from those of typical *silvestris* by their greyish-yellow colour, longer tail, over half the length of the head and body, and by the stripes on the nape ceasing abruptly at its hinder end. In this last feature he was presumably referring to the evanescence of the shoulder stripes; but in typical *silvestris* the tail is usually half the length of the head and body. The question is still further complicated by Altobello's claim that typical *silvestris* is found in Tuscany in the north and Calabria in the south of Italy, the area occupied by *molisana* coming in between the two, a possible but improbable occurrence.

Specimen in the Collection

1	Rome (received made up as necklet)	E. C. Taylor [P]	46.91

Felis silvestris morea, Trouessart

1833. *Felis catus ferus*, Geoffroy St. Hilaire, Expéd. Sci. de Morée, 3, pt. 1, Zool., p. 13, Atlas, pl. 1A; Reichenbach, Vollst. Naturg. Raubsäug., p. 362, *1852*.

1904. *Felis catus morea*, Trouessart, Cat. Mamm., Suppl., p. 273 (north of Dragomanou, near Mt. Diaphorti, Province of Messenia, Morea); Harper, Journ. Mamm., 21, p. 191, 1940.

1912. *Felis silvestris silvestris*, Miller, Cat. Mamm. Western Europe, pp. 462–3, 1912 (in part, specimen from Athens).

1934. *Felis silvestris morea*, Pocock, Journ. Linn. Soc. Zool., 39, pp. 8–10.

Geographical Distribution.—Southern Greece, range unknown.

Diagnosis.—Provisionally admitted as a distinct race on the evidence of an adult ♂ specimen from Athens which differs from the skins assigned to typical *silvestris* and to *euxina* in its brighter, yellower ground tint; the skull also has several puzzling peculiarities.

Colour.—The coat, apparently late winter, is exceptionally luxuriant for so southern a latitude, being 50 to 51·5 mm. long and thickened with a quantity of wool which is matted at the base of the contour-hairs, suggesting imminence of the moult. It is much fuller and longer than in the Southern Spanish race of about the same latitude, and in those respects resembles the coat of the more northern Central European race. The general colour is rather richer, yellower and less grey than in the skins of the latter owing to the pale areas of the contour hairs being decidedly more buffy, especially on the dorsal area and on the basal half of the upper side of the tail. The dorsal pattern is normally heavy and black; the lateral stripes are better defined, being distinct and brown anteriorly, but fainter on the upper part of the thigh, although blacker in front, lower down and above the hocks, and the hind foot is deep brown below the hock posteriorly, turning to black on the sole of the foot; the outer side of the fore leg is faintly striped, but there are two silvery stripes on its inner side and behind the upper lip; chin and throat are white, the cheek-stripes are faint and the anterior throat stripe is absent. No flesh measurements are available.

Skull.—The skull, sexed by the skin as ♂, is fully adult. It is peculiar in the association of three features. The median frontal suture is obliterated and the orbital rings are complete, the two processes being tolerably widely and firmly fused. Both these features suggest advanced age. On the other hand, the cranium is rounded and smooth, showing no trace on the frontals of the temporal ridges which are only just visible as two faint, juxtaposed, converging lines behind the suture. The carnassial teeth are large, as in the skulls from Dobrudscha, but the canine is only 5 mm. at the base. As a dental abnormality, there are two small premolars, probably pm^1 and pm^2, in the postcanine space of the upper jaw on both sides.

Specimen in the Collection

♂	Athens	C. W. L. Merlin [P]	47.7.22.2

Felis silvestris euxina, Pocock

1943. *Felis silvestris euxina*, Pocock, Ann. Mag. Nat. Hist., 11th ser., 10, p. 701 (Baspunar in Dobrudscha, Rumania).

Geographical Distribution.—Rumania and apparently South Russia.

Diagnosis.—Distinguished from typical *F. s. silvestris* by its larger teeth and possibly on the average by its more distinct pattern.

Colour.—A barely adult ♀ (12.5.23.2), January 24, has the coat full and long, up to about 55 mm. The general ground colour of the upper side is silvery grey with a buff tinge on the spinal area and richer buff on the basal half of the upper side of the tail, the legs being greyish buff in front and the back of the ears uniformly dull ochreous and contrasted with the white speckled head; the under side, apart from the whitish chin and fore throat, is mainly buff throughout, with an overcast of white-tipped hairs, especially on the chest, but passes into richer, more ochreous tint on the inner side of the thighs, the genital area and the basal part of the tail. The pattern on the head, nape, shoulders and spine is strong and black; the lateral pattern is also conspicuous from the shoulders to the hocks, stronger than in any of the available skins of typical *silvestris* from France and Germany, but not so pronounced as the dorsal pattern owing to the stripes being diluted with buff speckling, yielding a brindled effect, although on the thighs and especially just above the hocks they are darker; the back of the hind foot below the hock is deep brown above, turning to black below on the soles; the fore leg has about four indistinct stripes externally and two strongly emphasised on the inside with a good deal of black below the elbow; the tail has four stripes, the first being indistinct above and incomplete below.

The type, a young adult ♂ (12.5.23.1), Baspunar, January 22, has the coat as in the ♀, but the general coloration above is duller, the ground tint being noticeably less silvery owing to the pale areas of the contour hairs being buffy instead of clear white and the pattern, except on the head, mid-nape and spine, fainter and paler yellowish brown, but it is more distinct on the average than

in typical *silvestris*; the under side differs from that of the ♀ in being much whiter on the throat behind the interramal area and more intensely ochreous on the genital region and the basal part of the tail below.

MEASUREMENTS

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
			in.	in.	in.	in.
♂	Baspunar, Dobrudscha	12.5.23.1	22⅜	13⅜	5⅜	2½+
♀	Testemel, Dobrudscha	12.5.23.2	20¼	13	5⅜	2½−

SKULL.—The two available skulls are young adult, not fully developed, and differ in no particulars from those of *F. silvestris silvestris*. The dentition, however, is noticeably heavier on the average, but intergrading in some respects. Thus pm^3+pm^4 are 20½ and 19½ mm. in the ♂ and ♀ respectively; in *F. s. silvestris* they are from 17 to 19 mm., the average being 18 mm. The antero-posterior diameter of the upper canine at the end of the enamel-cap is 6 mm. in both skulls; in *F. s. silvestris* it ranges from 4 to 5½ mm., the average being 4½ mm. In the lower jaw the posterior cheek-teeth are 21½ mm. ♂ and 20 mm. ♀; in *F. s. silvestris* they range from 19 to 22 mm., the average being 20¼ mm., the lower canine is 6½ mm. ♂, 5 mm. ♀; in *F. s. silvestris* it ranges from 4 to 5 mm., the average being 4½ mm. The superiority in size of the two carnassials (pm^4, m_1) in *F. s. euxina* is shown in the tables, their averages in *F. s. silvestris* being 11 mm. and 8 mm. respectively.

The skull of *F. s. silvestris* with the upper and lower cheek-teeth 19 and 22 mm. is that of the adult ♂ from Tübingen; but its upper and lower canines are 5 and 4½ mm. respectively. The skull of the same race with the upper and lower canines 5½ and 5 mm. is that of the ♂ from near Moulins (19.7.7.2901), and its upper and lower cheek-teeth are 18½ mm. and 21 mm. These two skulls of *F. s. silvestris* come nearest to *F. s. euxina* in the size of their teeth.

SPECIMENS IN THE COLLECTION

♂	Baspunar, Dobrudscha, Rumania (R. Rettig)	Hon. N. C. Rothschild [P]	12.5.23.1 type
	Testemel, Dobrudscha, Rumania (R. Rettig)	Hon. N. C. Rothschild [P]	12.5.23.2

Felis silvestris caucasica, Satunin

1905. *Felis catus caucasicus*, Satunin, Mitt. Kauk. Mus. 2, pp. 154 and 316 (Borzhom, Caucasus).

1916. *Felis silvestris trapezia*, Blackler, Ann. Mag. Nat. Hist., 8th ser., 18, p. 73 (Khotz, near Trebizond).

1930. *Felis silvestris caucasicus*, Ognev, Zeitschr. Säugetierk, 5, p. 52; *id.* Mamm. U.S.S.R., etc., 3, p. 118, 1935; Pocock, Journ. Linn. Soc. Zool., 39, p. 11, 1934.

SKULL AND TOOTH MEASUREMENTS OF *FELIS SILVESTRIS MOREA* AND *FELIS SILVESTRIS EUXINA*

Sex	Locality	Number	Total length	Cond. bas. length	Zygom. width	Cranial width	Postorb. width	Int. orb. width	Max. width	Bulla	Mand. length	pm^1	m_1
	Felis s. morea		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Athens . . .	47.7.22.2	(98 ±)	(92 ±)	68	46	35	18	24	—	64	12	9
	Felis s. euxina												
♀ yg. ad.	Dobrudscha, Rumania (type)	12.5.23.1	93	86	63	47	34	16	23	18 : 16	59	$12\frac{1}{2}$	9
♀ yg. ad.	,, ,, ,,	12.5.23.2	(93 ±)	—	64	—	31	15	23	—	60	12	10
—	Triaspul, Dniester, South Russia	(*vide* Ognev)	91	—	67	42 +	$32\frac{1}{2}$	18	—	$21\frac{1}{2}$: 15	—	12	10

The specimen from Triaspul, identified by Ognev as *F. silvestris silvestris*, is for geographical reasons provisionally assigned to *F. s. euxina*.

Geographical Distribution.—South-east Russia, north and south of the Caucasus, Asia Minor.

Diagnosis.—Distinguished from typical *silvestris* by its darker, duller colour on the average, and by its larger size, resembling *tartessia* in the latter respect, judging from the skull and teeth, but differing in its longer, fuller coat and much less strongly emphasised pattern; in its duller coat and less distinct pattern on the average it also differs from *grampia*. The hairs at the tip of the ears also form a definite, though short "pencil", about 4 to 5 mm. long, longer than in any of the skins of the three European races. Apart from its slightly greater length and larger teeth on the average, the skull apparently only differs from that of *silvestris* in having the nasals on the average more constricted and narrower.

This diagnosis is taken from a few skins and skulls in the British Museum and from Ognev's table of skull and tooth measurements.[1]

Colour.—A ♂ skin from the Caucasus (79.11.15.4), undated, but probably early winter, has the coat about 45 mm. and not very full; the general colour is darkish olive grey above with comparatively fine buffish grey speckling, and the wool differs from that of all the other skins of the species examined in being uniformly darker grey throughout, not buff or ochreous at the summit; the dorsal pattern is black, the spinal stripe forming an unusually well-defined narrow line with elongated black spots on each side of it; the lateral pattern is distinct, but brown from the shoulders to the thighs and hocks, and on the body is more broken up into smaller spots than is usual in *F. silvestris*; the fore leg is indistinctly striped, but has a good deal of black about the elbow, and the hind foot is black up to the hock behind.

An adult ♀ skin, an example of *trapezia*, from Scalita, south of Trebizond (6.3.6.218), December 14, has the coat about 48 mm. long, fuller than in the Caucasus skin, from which it also differs in having the wool pale buff at the summit, more ochreous tint on the breast and belly, and bigger lateral blotches, but the general colour is darkish olive grey, as in that specimen. A ♂ topotype of *trapezia* from Khotz, near Trebizond (6.5.1.30), February 6, is much paler than the last, being distinctly frosted with grey, and has the wool much richer buff at the summit; the lateral pattern is faint, but stronger above the hocks. It closely matches the skins typical of *silvestris* from Caterille and from Burgos, North Spain (8.7.7.10). Another ♂ from Khotz (6.5.1.29), February 6, closely resembles the last and almost exactly matches the skin from North Germany, but has the lateral pattern better defined.

Skull.—Ognev published measurements of eleven presumably adult ♂♂ of this race from various localities in the Caucasian area. A selection of these showing the range in variation is entered in the table (p. 51). Their average condylobasal length, with that of the single Caucasian skull in the British Museum, is, as nearly as maybe, 97·5 mm., about the same as in the Spanish race, *tartessia*, some 4 mm. more than in the Scottish race *grampia*, and about 7 mm. more than in the typical race from Central Europe. Similarly, the

[1] This author's description of the race in which presumably the pattern and colour variations are discussed, is printed and written in Russian, which I am unable to read.

average condylobasal length of four ♀♀ entered by Ognev is just about 91 mm., surpassing that of *grampia* by 6 mm. There are not enough ♀ skulls of *tartessia* and typical *silvestris* for comparison. The teeth also are large, pm^1 ranging from 11 to 13 mm., the average in twelve ♂ skulls being very nearly 12 mm., as in *tartessia*, whereas in typical *silvestris* and in *grampia* it is about 11 mm.

The skulls from near Trebizond, described as *trapezia*, and the one from Mount Taurus, entered in the table, are not included in the summary given above. The ♂ skulls from Khotz are not fully developed, the only adult of the *trapezia* series being the ♀ from Scalita, which is 5 mm. shorter in condylobasal length than the smallest ♀ of the Caucasian skulls. In 1934, before seeing Ognev's complete table of measurements of the latter, I assigned *trapezia* to the synonymy of *caucasica*, but the evidence supplied by the ♀ skull of *trapezia* supports in a measure Blackler's claim that his Trebizond race may be distinguished from the Caucasian form by its smaller skull. The teeth also, especially m_1, appear to be a little smaller; pm^1 in both sexes is smaller on the average, but the canines in the ♂ are 5 mm. at the base, as in the ♂ Caucasian skull (79.11.15.4). Hence *trapezia* may perhaps prove to be a valid race distinguished by its smaller skull and teeth.

The three skulls from Khotz illustrate the variation in the constriction of the nasals distinctive of this race. In the type of *trapezia* the constriction is very pronounced, the median length of the bones being 23 mm. and the least width only 3 mm. In none of the western races are the bones so thin, but in the two topotypes those dimensions are 20 mm. and 4 mm., 21 mm. and 5 mm., and in the ♀ from Scalita they are the same as the last. The proportion is nearly the same in the ♂ from the Caucasus, namely 24 and 6 mm.

The adult skull from Mount Taurus is unsexed, but appears to be ♀, and agrees in its dimensions with ♀♀ of typical *caucasica* recorded by Ognev. Its unusually short nasals are only 17 mm. along the median line and wide at their narrowest point. Their upper ends fall 5 mm. short of the upper ends of the maxillae, whereas in the other skulls assigned to *caucasica* they are about level with the maxillae or slightly surpass them. This, however, is known to be an individually variable feature in *F. s. grampia* (see p. 38).

Specimens in the Collection

♂	Caucasus	Warsaw Museum [P]	79.11.15.4
♂	Khotz, nr. Trebizond (A. Robert)	Oldfield Thomas [P]	6.5.1.28 type of *F. trapezia*
2 ♂	Khotz, nr. Trebizond (A. Robert)	,, ,,	6.5.1.29–30
♀	Scalita, south of Trebizond (A. Robert)	,, ,,	6.3.6.218
Skull	Zebil, Taurus	C. G. Danford [C & P]	76.8.7.18

Felis lybica, Forster

(Synonym under subspecies)

1780. *Felis lybica*, Forster, Buffon Nat. Vierfüss. Thiere, 6, p. 313 (Gafsa, Tunis).

Skull and Tooth Measurements of *Felis silvestris caucasica*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	pm^1	m_1
			mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Kuban, North-west Caucasus . .	(*vide* Ognev)	112	103½	76	48	33	21	—	23+:15	—	11½	8½
♂ ad.	Kuban, North-west Caucasus . .	(*vide* Ognev)	104	99	73+	45	34½	20	—	23 : 15	—	12	10
♂ ad.	Near Vladikavkaz .	(*vide* Ognev)	105½	96	78	46+	33+	21	—	23 : 16½	—	12	10
♂ yg.	Maikop . . .	(*vide* Ognev)	95	88+	67	43½	37½	20	—	20 : 16	—	11	8
♂ ad.	Caucasus . .	79.11.15.4	101	95+	69	46	33	18	25	21½:15	—	11	—
♀ ad.	Tersk . . .	(*vide* Ognev)	99	91	69	46+	34−	19	—	21 : 15	—	12½	8
♀ ad.	Near Vladikavkaz .	(*vide* Ognev)	95½	87+	65	43+	30	18	—	20 : 15	—	10+	—
♀ ad.	,, ,, .	—	92½	85	65	41	35	17½	—	20 : 15	—	11	8½
♂ yg. ad.	Khotz, nr. Trebizond (type of *trapezia*)	6.5.1.28	93½	87	67	43	33	17	23	19 : 14	64	10	8
♂ yg. ad	Khotz, nr. Trebizond	6.5.1.30	90	82	60	43	30	15	21	19 : 14	59	11	7
♂ yg. ad.	Khotz, nr. Trebizond	6.5.1.29	88	81	62	41	32	15	22	19 : 14	58	11	7
♀ ad.	Scalita, south of Trebizond	6.8.6.218	86	80	62	—	—	14	21	18 : 12	58	10	7+
ad. ♀ ?	Zebil, Taurus . .	76.8.7.18	95	87	66	43	33	17	23	21 : 14	—	11	—

Diagnosis.—Closely allied to *F. silvestris*, but distinguishable at a glance by the comparative inconspicuousness of the stripes on the nape and shoulders, the less sharply defined stripe on the spinal area and typically by the slender, more tapering tail,[1] which is not so bushy, cylindrical, or even subclavate as in *F. silvestris*. There is typically a spinal crest and the ears are normally tipped with a small tuft. There is no constant difference between the skulls and teeth of the two species.

Geographical Distribution.—Sardinia certainly and possibly Corsica, Majorca, and Italy in Europe; the whole of Africa, except the thick forested area, from Morocco and Egypt to the Cape Province, and thence northwards to Angola; in Asia from Arabia and Palestine to Northern India and the Turkestan area.

Remarks.—As a result of its wide range and adaptation to diverse environments, including bush and desert conditions, this species exhibits much greater variation in colour and pattern than *F. silvestris*. The skull and teeth, too, are less constant in form, a noticeable variation in the teeth being the occasional great reduction in size of the inner lobe (protocone) of pm^1, which occurs as an individual peculiarity in some skulls of the South African races.

Skins alone are frequently very difficult to distinguish from those of feral house-cats of the *torquata*-type of pattern, which is seldom the case in *F. silvestris*; but the feral cats, when skulls are available, may commonly be determined by their smaller teeth.

Felis lybica sarda, Lataste

1843. *Felis lybica*, Geoffroy St. Hilaire, Descr. Coll. Jacquem., Mamm., etc., p. 56 (Tangiers); [and of many subsequent authors at least in part as *libyca* or *lybica* (not *F. lybica*, Forster, 1780, nor *F. libycus*, Olivier, 1804)].

1867. *Felis lybicus*, Loche, Expl. Alg., Mamm., p. 42.

1885. *Felis libyca* var. *sarda*, Lataste, Actes Soc. Linn. Bord., 39, p. 231 (Sardinia); *id.* Explor. Sci. Tunisie, p. 16, 1887.[2]

1895. *Felis mediterranea*, Martorelli, Atti. Soc. Ital. Sci. Nat., Milano, 35, pp. 250–2, 266, pls. i, ii (Sardinia).

1910. *Felis ocreata sarda*, Troussart, Faune Mamm. d'Europe, p. 101.

1912. *Felis sarda*, Miller, Cat. Mamm. Western Europe, p. 468, 1912.

1906. *Felis ocreata mauritana*, Cabrera, Bol. Soc. Esp. Hist. Nat., 6, p. 362 (Mogador).

[1] In the aberrant Turkestan race *F. l. caudata* the tail is very bushy in winter; but the general pattern of the body is quite different from that of *F. silvestris*.

[2] When Lataste described this cat from Sardinia he was unacquainted with Algerian examples of the race. Subsequent examination of skins from Bone convinced him of the identity of the two and he withdrew the name *sarda* in 1887 under the erroneous impression, held by many authors, that the older name *lybica* or *libyca*, which must be regarded as spelling variants, was applicable to the dark-coloured North African race. Lataste's skins from Sardinia and Algeria, with several others in the British Museum from those localities, confirm his opinion regarding their subspecific identity. Ignoring Lataste's name, *sarda*, Martorelli proposed *mediterranea* for examples from Maremma and Pisa in Tuscany and from Sardinia. Miller selected Sardinia as its type locality.

1920. *Felis lybica cyrenarum*, Ghigi, Mem. Real. Accad. Sci. Ist. Bologna, cl. di. sci. fis. (7), 7, p. 79 (Cyrene).
1929 ?*Felis reyi*, Lavauden, C.R. Acad. Sci. Paris, 189, p. 1023 (Corsica).
1930 ?*Felis catus jordansi*, Schwarz, Zool. An., 91, p. 223 (Majorca).
1931. *Felis lybica constantina*, Cabrera, Trav. Mus. Nac. Cienc. Zool., 56, p. 167; G. M. Allen, Bull. Mus. Comp. Zool., 83, p. 236, 1939 (not *F. constantina*, Forster, 1780).
1944. *Felis lybica sarda*, Pocock, Proc. Zool. Soc., 114, p. 66.

Notes on Synonymy.—In the last paper quoted in the synonymy I gave in some detail my reasons for choosing the name *sarda* for this race and for rejecting the much older name *constantina* adopted for it comparatively recently by Cabrera and following him by G. M. Allen. Briefly stated they were as follows: (1) Buffon's description of the cat seen by Bruce at Constantine in Algeria is inapplicable in most respects to the North African wild cats of this species but agrees tolerably closely with the Serval (*Leptailurus*) of that district. (2) The wild cat of Sardinia appears to be racially indistinguishable from the cat identified as *constantina* by Cabrera, who correctly stated its range to be from Morocco to Algeria. Hence *sarda*, as the oldest admissible name, must be accepted as stated in my paper in 1944. Two names entered by Cabrera in the synonymy of this race drop out of it with *constantina* since they were applied to the same cat, namely *constantinensis* Link, 1795, and *algiricus* Fischer, 1829.

Diagnosis.—A bush-cat intergrading with the North African semi-desert race *F. l. lybica* (p. 61), but usually readily distinguishable by its darker ears and generally darker upper side, without the "sandy" hue of that race, the flanks being speckled silvery white or buffy white and black, resulting in a clear grey or more tawny grey tint. Only when the coat is disturbed or thinning with the moult, so as to expose the buff or ochreous wool, is a yellowish cast imparted to the pelage. The under side varies individually from deep rusty ochreous to pale buffy grey. The spinal band is typically blackish and sharply emphasised, but may be comparatively ill-defined; the pattern of stripes and spots on the flanks may be tolerably conspicuous or faint or obsolescent and the stripes on the legs may be strong and black or weaker and brown.

Well-marked variations may occur in the same district, whereas specimens from remote localities may be almost alike.

Colour variation in Sardinian skins

Two adult ♂ skins from the type locality, Sarrabus, in Sardinia (Doria), differ considerably. The type (Lataste, 19.7.7.3020), March 5, has the hairs on the flanks 35 and on the crest 46 mm., the general colour above is tawny grey, the lateral contour hairs being speckled buffy grey and fuscous, and those of the spinal area ochreous and black; the wool of the upper side is everywhere rich ochreous, showing no appreciable dullness of tint over the fore back and shoulder, and where the contour hairs are moulting and exposing the wool, as on the nape, a reddish cast is given to the pelage; the pattern on the sides consists of faint brown brindling; the head has the crown deep brown, much darker than the nape, and finely speckled with greyish buff; the backs of the

ears are reddish at the base, dark brown mesially, and gradually blackening at the tip; the patches bordering the eyes internally are buff, the muzzle red, the cheeks buffy grey with their stripes brown; the chin buff in front, passing into dirty white behind; the throat is ochreous with a grey cast and a brown collar; the chest and abdomen are richer ochreous, with dark brown spots; the genital area, base of the tail below and backs and inner surfaces of the thighs are rusty ochreous, this tint gradually fading down the inner surface of the hind leg; the fronts of the legs are buffy grey, becoming buffier on the paws, their external stripes are brown, the bracelets are blackish and the hind foot to the hock is blackish behind; the tail has three separated black stripes in front of the black tip, the first very faint.

The topotype (Doria, 88.12.1.1), March 30, with the coat 43 and 58 mm., differs from the type in having more black and white and less red in the pelage. The sides of the body are silvery grey, white speckled with black; the spinal area has more black in it and is strongly emphasised by the clear grey of the flanks; the wool is nearly the same rich hue as in the type, but on the spinal area its bright tint fades away on the fore back and shoulders; the coat is in better condition and nowhere shows the wool unless disturbed, and the obscure pattern is blacker; the crown of the head is greyer and has traces of black stripes; the ears are browner, not so red at the base behind and the black tip is much more sharply defined; the interocular patches are white; the chin and interramal area are whiter, the throat, chest and fore belly are buff, more overcast with white, not nearly so deeply tinted as in the type and the hind belly, insides of the thighs and base of the tail not so rich, the spots on the chest and the collar being blacker; the legs are grey, without buff tint, and their stripes are black; the tail has its stripes broader and largely confluent in the middle line.

The rest of the Sardinian skins in the British Museum very closely resemble the topotype from Sarrabus in the clear grey hue of the upper side, but several are like the type in the deep ochreous hue of the under side; no two skins being quite alike in every respect.

A ♂ from Ogliastra (Wolterstorff, 0.5.24.1), December 28, with the hairs on the flanks and crest 33 and 53 mm., differs from the topotype in having the lateral pattern a little more distinct; the wool and the lower side paler, the ears darker and the tail-stripes not fused above. An undated ♀ labelled Sardinia (Linnæa, 86.7.10.1), with the hairs 42 and 54 mm., is rather darker above than the topotype owing to the silvery area on the hairs being less extensive, the spinal wool is ochreous only on the loins, being dark purplish brown from the mid-back to the shoulders, the ears are darker, blackish brown throughout; the lateral pattern is more distinct and the lower side much redder, even more richly and deeply tinted than in the type. A young adult, marked ♀ (Lord Cranbrook, 34.1.19.2), without special locality, is a little darker above than the topotype owing to the silvery speckling being less extensive and slightly duller, thus approaching the type which it closely resembles in the rich deep hue of the under side, but the pattern is more distinct than in any of the foregoing. In a still younger ♂, with the same history (34.1.19.1), April 16, the coat is

much shorter, 28 and 40 mm., and the pattern of brown stripes and spots is still stronger, but the lower side is not so richly tinted.

Since the reference of Sardinian skins to the same race is not likely to be questioned, the individual variations are a useful guide to the systematic value of the differences between skins of similar cats found elsewhere.

1. In accordance with the season the hairs on the flanks vary from about 30 to 40 mm., and on the spinal crest from about 40 to 55 mm.
2. The ground colour above varies from clear dark grey, due to the blending of the white and black speckling of the contour hairs, to tawny grey, when the pale speckling is buffy instead of white; the clear grey phase varies in tint in accordance with the extensiveness of the white banding on the individual hairs. The general colour is also subject to variation with the condition of the coat. When the contour hairs are thinning with the moult, the consequent exposure of the wool, either in patches or larger areas, imparts a brighter, yellower aspect to the pelage.
3. The spinal area is sometimes strongly emphasised by its black and ochreous or buff speckling, but is sometimes only slightly darker than the flanks and ill-defined.
4. The summit of the wool of the flanks may be buff or ochreous, on the spinal area it varies from rich ochreous from the shoulders to the root of the tail to dull ochreous on the loins and purplish or greyish brown on the rest of the back.
5. The backs of the ears are black or darkened at the tips to a varying extent, below this mesially they are blackish brown or rusty brown or grey brown, and at the base dull or bright ochreous to a very variable extent.
6. The crown of the head may show traces of pattern, and is dark but speckled with buff or whitish more or less, the speckled area advancing between the eyes; the pale patches on the inner sides of the eyes are buff or whitish, the summit of the nose pale reddish; the upper lip below the rhinarium is buff or white; the cheeks are grey or tawny grey, and their stripes blackish or reddish.
7. The chin and interramal area are clear white or buffy, and there may be one or more reddish or blackish collars on the throat; the rest of the under side, including the genital area, the inside of the thighs, and the base of the tail vary from deep rusty ochreous to pale greyish buff, with a little bright colour restricted to the genital area.
8. The pattern on the body varies greatly in distinctness, consisting sometimes merely of faint patches, sometimes of comparatively conspicuous stripes and spots. On the outer sides of the limbs the stripes may be strong and black or faint and brown; and on the tail the terminal black stripes and black tip may be separated or fused along the middle line dorsally; on the lower side the pattern varies from black to reddish brown and the incidence of blackish or reddish collars on the throat is individually variable.

Colour variation in North African skins

Algerian skins show individual difference in the same locality similar to those of Sardinian skins, which in a general way they closely resemble. An undated adult ♂ (Tristram, 7.1.1.47), from south of Algiers, with the coat 40 and 56 mm. long, closely resembles the topotype of *sarda* in the colouring of the upper side, but the silvery speckling is less extensive, as in the Sardinian skin (86.7.10.1), and the spinal area is not nearly so black, although its wool is a trifle deeper in tint; the ears are a little more rusty, the stripes on the hind legs fainter, and the under side richer ochreous. A ♀ (7.1.1.48) with the same history, probably from the same locality, but labelled merely Algeria, is, however, much paler below than the ♂, slightly paler even than the topotype of *sarda*, the pale speckling of the flanks is as extensive as in the topotype, but not quite so silvery and the ears are browner, less rusty, and blacker at the tips than in Tristram's ♂.

Two skins from Bone, Algeria (Lataste), differ from each other more profoundly than the two preceding collected by Tristram. One of them (19.7.7.3127) closely resembles Tristram's ♀ (7.1.1.48) in its generally paler hue due to the extensive whitish speckling of the flanks, but it is even paler below, the tint being dull, buffy grey; the ears are rather rubbed, but seem to have been rusty brown at the back without any appreciably blacker tip. An adult ♂ (19.7.7.3128) is, on the contrary, much darker and very like the type of *sarda* in its tawnier grey tint above, in having the wool partially exposed, giving the "reddish" hue described by Lataste, and in the deep rich ochreous colour of the under side; but the pale speckling above is a little buffier, less clear, and the stripes on the hind legs are stronger; the backs of the ears are very different from those of the first described skin from Bone, being extensively blackish at the tip, as in Tristram's ♂ skin (7.1.1.48), but more rusty brown below as in Tristram's ♂ (7.1.1.47). It was the unmistakable likeness between this skin from Bone and the skin of the type of *sarda* that convinced Lataste of the racial identity between these Sardinian and Algerian cats.

A skin from Tangiers (51.4.23.8), unmistakably resembling those from Sardinia and Algeria, is interesting as a topotype of Geoffroy's *Felis tybica*, which was recorded from Oran. The coat is 35 and 50 mm. long; the flanks are grey, extensively whitish with fuscous speckling, and marked faintly with brownish pattern, the spinal area being black and ochreous; the wool of the flanks is buff, of the spinal area rich ochreous from the shoulder to the tail root; the backs of the ears are rusty brown, with a black tip; the crown has a broken-up pattern of black spots; the nose is red, paler and brighter than the ears; the patches on the inner sides of the eyes are whitish buff; the cheeks are buffy, with the upper stripe dark brown, the lower reddish; the lower side, apart from the white chin and fore throat, is buff, with faint fuscous spots; the legs are grey in front, with the paws pale buff, the inner side of the hind legs is ochreous, with the foot black to the hock; the bracelets are strong and black and the external pattern of the limbs is moderately well defined and blackish brown. This skin is very like the skin from Ogliastra, in Sardinia, in the colouring of the upper

and the under sides, but the spinal area is better defined, the pattern of the flanks is fainter and the ears are paler; the ears, however, are like those of the topotype of *sarda*, but not quite so reddish at the base. It also closely matches Tristram's ♂ skin from south of Algiers, and has the same coloured ears, but is more extensively whitish speckled above and much paler below; and it hardly differs from the paler of the two skins from Bone (19.7.7.3127), except that its ears are darker.

Three skins (4.7.5.7–9), labelled Morocco, but without particular locality, resemble the one from Tangiers and the greyer Algerian and Sardinian skins sufficiently closely to call for no detailed description. They vary individually. In one (4.7.5.8) the wool above is as rich as in the ♂ from the south of Algiers, and has the under side only a little paler, but the spinal area is darker, as in some Sardinian skins. In another (4.7.5.9) the wool and the under side are pale, as in the ♀ from Bone. But a skin in the Quex Museum from Khenifra (Curio), Morocco (Captain Carpentier), March 12, with the flank hairs 45 mm. and the crest 58 mm., is noticeably clearer, more silvery grey above than the preceding Moroccan skins, but shows a similar faint brindled pattern, has the under side buff, the wool on the flanks brightish buff, and on the crest ochreous.

A female skin (Fraser, 47.10.21.8), labelled Shebel L'Enserin, Tunisia, with the hairs on the flanks 38, on the crest 48 mm., is the same colour above as Tristram's Algerian male, although the summit of the wool on the flanks is pale buff and much less rich in hue, and the ears are rusty brown almost throughout, only slightly darker at the tip. Also, there is no rich ochreous on the abdomen posteriorly, but the genital area is richly tinted reddish ochreous. The pattern is strong only on the tail and inner side of the fore legs, being just traceable as faint patches on the sides of the body, weak on the fore and hind legs externally, scarcely visible on the chest and the cheek-stripes are reddish.

A skin from "Longstop Hill", 600 ft., Western Tunisia (Payn, 43.26), April, with the flank hairs 30 and the crest 50 mm., is unusually silvery grey above, with the spinal area sharply defined and the dorsal pattern obsolescent. It closely matches the skin from Khenifra, Morocco, above referred to, and differs from the foregoing Tunisian skin not only in its more silvery hue above, but in its brighter tint and stronger pattern below, its more strongly striped legs, and duller tinted ears. The habitat of this cat was rocky ravines overgrown with scrub.

A skin (39.1670) in the Tring Museum, collected by Hartert on May 10, in the juniper woods on the plateau north of Merdj, in Cyrenaica, and no doubt representing *F. lybica cyrenarum*, is racially indistinguishable from the foregoing. In the colour and pattern of its upper side it is an almost exact match of Cranbrook's Sardinian skin (34.1.19.2), except that the partial exposure of the wool by the seasonal thinning of the contour hairs gives a reddish cast to the pelage, the head is not so dark, the ears are a little paler, and the cheeks with their stripes lighter and more buffy. The lower side also is not so deeply ochreous, resembling that of the other Sardinian skin (34.1.19.1).

A particularly interesting male skin (34.8.2.7), without skull, was collected by Colonel Meinertzhagen on March 17 in the Arak, Hoggar Mountains in the

Algerian Sahara. It closely resembles the Algerian skins in its generally dark hue, apart from the spinal area, which is more uniformly ochreous, lacking the contrasted black and ochreous speckling. The skin, however, is in poor condition and the spinal crest is thin, moulting and probably faded; the flanks are silvery speckled, the lower side is pale ochreous, overcast with white, and the backs of the thighs and the genital area are bright reddish ochreous; the hind foot is black from the hock downwards, and the ears are dark brown at the base, blackish in the upper part. Colonel Meinertzhagen tells me (*in litt.*) that the Hoggar plateau attracts a great deal of moisture, and that the humidity is relatively high. There is nothing like the Algerian forests, but there is a lot of bush in the ravines, especially where the cat was killed.

None of the skins of this race in the British Museum has measurements taken in the flesh; but Martorelli recorded the following dimensions, converted into English inches, for two of his examples of *mediterranea*; and Cabrera gave the dimensions of his type of *mauritana*.

MEASUREMENTS

Sex	*Locality*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
		in.	in.	in.	in.
sub. ad.	Tuscany	22⅜	12½	(3⅜)	2
? young	Sardinia	19⅜	10⅝	—	—
♂ ad.	Mogador (type of *mauritana*)	21½	13½	5⅜	(3¼)

The length of the hind foot in Martorelli's specimen from Tuscany excluded the digits; and Cabrera's ear measurement of *mauritana*, given as 80 mm., must have been taken from the base behind, unless 80 was misprinted for 50 or 60.

SKULL.—Adult ♂ skulls, which have an average condylobasal length of 88 or 89 mm., differ individually sometimes to a considerable extent in muscular moulding and other respects. Of the two from Sarrabus, Sardinia, the topotype is the older and has much wider zygomata, the occipital crest more prominent, giving it a relatively greater total length, and the sagittal crest on the posterior slope of the crown about 4 mm. high; but although the temporal ridges are only 5 mm. apart on the suture, the postorbital area is wide, as in ♀ skulls; its upper facial profile shows an abrupt down-bend at the middle of the nasals, making the anterior end of these bones markedly concave. The skull of the type differs in having the sagittal crest 2 mm. high, the temporal ridges 11 mm. apart, the downward slope of the nasals much less abrupt, and the teeth smaller owing to wear. The two ♂ skulls from Algeria differ from each other much more profoundly, the two Sardinian skulls being in some respects intermediate between them. The one from South Algeria (7.1.1.47) is strongly moulded. Its sagittal crest is as high as in the topotype; and, although its temporal ridges are 8 mm. apart, its postorbital area is noticeably constricted; the facial profile

SKULL MEASUREMENTS OF *FELIS LYBICA SARDA*, *FELIS LYBICA OCREATA*, AND *FELIS LYBICA BUBASTIS*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	pm^4	m_1
	Felis lybica sarda		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Sarrabus, Sardinia (type of *sarda*) .	19.7.7.3019	95	87	66	43	34	15	23	22 : 16	62	11	8
♂ ad.	Sarrabus, Sardinia	88.12.1.1	100	89	72	46	34	19	25	21 : 16	67	12	9
♂ yg.ad.	Sardinia . .	34.1.19.1	89	81	60	45	33	16	22	20 : 15	58	11	9
♀ ad. ?	,, . . .	86.7.10.1	94	83	64	44	34	18	23	21 : 15	61	11	8
♀ .	,, . . .	34.1.19.2	93	84	65	45	35	17	23	20 : 15	62	12	9
♂ ad.	Mogador, Morocco (type of *mauritana*)	(*vide* Cabrera)	100	90	68	44	33	17	21	22 : ?	—	$11\frac{1}{2}$	—
♂ ad.	Bone, Algeria . .	19.7.7.3126	94	88	69	46	37	19	24	21 : 17	65	12	9
♂ ad.	South Algiers .	7.1.1.47	—	(89 ±)	69	43	28	16	23	19 : 14	64	12	9
♀ ad.	Tunisia . . .	43.26	(83)	60	—	—	—	—	21	—	58	11	8
♀ ad.	Tunis . . .	47.10.21.8	91	81	62	46	37	17	22	20 : 16	57	11	$7\frac{1}{2}$
	Felis lybica ocreata												
♂ ad.	Ozozo, Gondar, N. Abyssinia	(*vide* De Beaux)	—	97	74	—	—	—	—	—	(72)	$11\frac{1}{2}$	$8\frac{1}{2}$
♂ ad.	Adigrat, Tigre, N. Abyssinia	69.10.24.8	102	94	69	45	33	20	26	23 : 16	67	12	9
♂yg.ad.	Near Robi River, Abyssinia	46.93	9—	90	68	45	32	18	25	20 : 15	—	12	—
	Felis lybica bubastis												
♂ ad.	Egypt (Mummy Cat)	90.3.7.1	112	105	83	48	38	20	29	22 : 15	78	11	9

is shaped nearly as in the type, the down curvature of the nasal region being gradual and lightly convex. The skull from Bone, although fully adult, is muscularly unmoulded, the sagittal crest being only about 1 mm. high, the temporal ridges 19 mm. apart, and the postorbital area very wide, as in the ♀. It is also a high, vaulted skull, 4 mm. higher than the skull from south of Algiers and 2 mm. higher than the topotype from Sarrabus; the upper facial profile being strongly convex from the forehead to the end of the nasals, which are steeply sloped and show no concave curvature at their anterior ends, such as is present in the other ♂ skulls.

The young ♂ skull (34.1.19.1) from Sardinia calls for no special comment; but the slightly older skull (34.1.19.2), marked ♀, is probably ♂, judging from the size of the teeth, the basal diameter of the canine, where the enamel begins, being 5 mm., as in the topotype from Sarrabus and in the young ♂ skull (34.1.19.1), which although younger has pm^1 slightly smaller. In the only certainly known ♀ skull from Sardinia (86.7.10.1) the diameter of the canine is 4 mm. and the temporal ridges are 15 mm. apart. It has the upper facial profile gradually sloped; but in the ♀ from Tunis (47.10.21.8), which has the canine 4 mm. and the ridges 27 mm. apart, the upper facial profile is strongly convex, approaching the curvature of the ♂ skull from Bone, and the whole skull is very poorly moulded.

Specimens in the Collection

♂	Sarrabus, Sardinia (G. B. Traverso)	Marquis G. Doria [P]	88.12.1.1
♂	Sarrabus, Sardinia (G. B. Traverso)	F. Lataste [P] ex Marquis Doria's coll.	19.7.7.3019 skull (type of *sarda*) and 3020 skin
♀	Oghastra, Sardinia (Dr. Wolterstorff)	Oldfield Thomas [P]	0.5.24.1
	Sardinia	Purchased	86.7.10.1
♂,	,,	Lord Cranbrook [P]	34.1.19.1–2
♂	South of Algiers (Canon H. B. Tristram)	R. F. Tomes [P]	7.1.1.47
	Algeria (Canon H. B. Tristram)	R. F. Tomes [P]	7.1.1.48
♂	Bone, Algeria (Dr. Hagenmuller)	F. Lataste	19.7.7.3126–8
♂ juv.	Shebel L'Enserin, Tunisia (L. Fraser)	Purchased	47.10.21.8–9
	Longstop Hill, Western Tunisia	Capt. F. H. Payn [C & P]	43.26
1	Tangiers (F. Faravier)	Purchased	51.4.23.8
3	Morocco (Riggenbach)	,,	4.7.5.7–9
♂	Plateau of Merdj, Cyrenaica (Dr. E. Hartert)	Rothschild Bequest	39.1670
♂ skin	Arak, Hoggar Mts., Central Sahara	Col. R. Meinertzhagen [P]	34.8.2.7

Note.—Owing to lack of material for comparison I cannot definitely classify the cats described from Corsica and Majorca.

From the brief description I am unable to distinguish the Corsican Wild Cat, *F. reyi*, from *F. lybica sarda*. The type; the flat skin and skull of an adult ♀,

came from the forest of Aunes, but the cat was said to be found all over the island, in the hills as well as the low country. The general hue was dark, grey with brown pattern, the wool imparting a reddish wash to the pelage when the coat was disturbed; the spinal band was darker, the face reddish, the backs of the ears deep blackish brown, and the hind foot black to the hock. The head and body of the flat skin were 23⅛ inches, no doubt considerably stretched, and the tail just under 11 inches. The skull had a condylobasal length of 80 mm., about the same as in the ♀ skull (47.10.21.8) of *F. l. sarda* from Tunisia; but its zygomatic breadth was stated to be 70 mm., 8 mm. wider than in that specimen, and about as wide as in adult ♂ skulls of *F. l. sarda* with a condylobasal length of from 88 to 90 mm. Although it is known that the zygomata expand with age, there is probably an error in Lavauden's figure.

No specimens from Corsica are available for examination.

The cat from Mallorca (Majorca), Balearic Islands, described by Schwarz as *Felis catus jordansi*, was said to resemble most nearly the North African race he quoted as *F. catus mauritana*, here named *F. lybica sarda*, but to differ in having the pattern more strongly marked, the tail with six black rings, and the legs paler. The possibility of it being a feral house-cat was dismissed on account of its alleged very long winter coat, very red nose and ears, and other features, one of which was, no doubt, the rusty tint of the under side.

No skin from Majorca is available for examination, and I am unable to classify *jordansi* from the description, which calls for the following comments. The type, a young adult ♀, had the hairs of the back, i.e. the spinal area short, only 34 mm. long, which is about the same as in the feral domestic cat from Tunis recorded above (p. 15), but too short for the skins assigned to *sarda*. In one skin from Sardinia (34.1.19.1) the pattern is well defined because the skin is that of a young adult and short-coated like the type of *jordansi*; and Martorelli figured six rings on the tail in one of the specimens he named *mediterranea*. In most of the skins I assign to *sarda* the legs are well coloured; but in one from Tunisia (43.26) they are decidedly paler and more creamy.

A specimen (19.7.7.3015) of doubtful status, connecting *F. l. sarda* with the next race, is a ♂ from Mettamer, or Métameur, in Tunis, wrongly identified by Lataste as *Felis libyca* var. *margarita* (Actes Soc. Linn. Bord., 39, p. 231, 1885). It has the same dark greyish brown ears as the skin from Khenifra, in Morocco, and the Tunisian skin (43.26), above described, but differs from both in being decidedly paler grey owing to having less black speckling on the flanks and comparatively little on the spinal area, which is ochreous rather than black; also the wool on the flanks is cream rather than buff and that of the crest a shade paler ochreous. Its skull characters are described under *F. l. lybica*.

Felis lybica lybica, Forster

1780. *Felis lybica*, Forster, in Buffon Nat. Vierfüss. Thiere, 6, p. 313 (Gafsa in Tunisia).
1792. *Felis lynx lybiensis*, Kerr, Anim. Kingd., p. 156 (Gafsa).
1804 ?*Felis libyca*, Olivier, Voy. Emp. Oth., 3, p. 71 (Alexandria).

1824. *Felis maniculata*, Temminck, Mon. Mamm., p. 128 (Ambukol in Nubia); Cretzschmar Rüppell's Atlas zu Säug. (1), p. 1, 1826.
1824. *Felis ruppelii*, Schinz, Cuv. Thierr., 4, p. 509, 1824 or 1825 (Dongola); Syn. Mamm., p. 452, 1844 (under *maniculata*, but spelt *ruppellii*).
1832. *Felis dongolana*, Hemprich and Ehrenberg, Symb. Phys. Mamm., dec. 2 (Dongola).
1885. *Felis cristata*, Lataste, Actes Soc. Linn. Bordeaux, 39, p. 229 (not of Falconer and Cautley, 1836) (Haidra in Tunisia).
1902. *Felis lybica*, Anderson and de Winton, Mamm. Egypt, p. 171 (in part).
1906. *Felis ocreata lybica*, Cabrera, Bol. Soc. Esp. Hist. Nat., 6, p. 364 (in part; not *ocreata*, Gmelin).
1928. *Felis ocreata ocreata*, Lavauden, Bull. Soc. Hist. Nat. Afr. Nord., 19, p. 261 (in part; not *ocreata*, Gmelin).
1932. *Felis ocreata*, Howes, Proc. Zool. Soc., p. 388.
1932. *Felis lybica lybica*, Cabrera, Trab. Mus. Nac. Cienc. Nat. Zool., 57, p. 165 (in part); G. M. Allen, Bull. Mus. Comp. Zool., 83, p. 236, 1939 (in part).
1944. *Felis lybica lybica*, Pocock, Proc. Zool. Soc., 114, p. 66.

Notes on Synonymy.—As was the case with *constantina* (p. 53), Forster gave the name *Felis lybica* to a cat described by Buffon from information supplied by Bruce, who saw a specimen at Gafsa or Capsa in Tunisia. The only diagnostic feature mentioned for *lybica* was the "bright red" tint of the ears, indicating a much paler hue than that of the previous race, *sarda*.

Anderson and de Winton gave a full description of the colour of the type of *maniculata*, showing clearly that it belongs to the race here named *lybica*. According to these authors Olivier's *libyca* was *F. chaus nilotica*. Others have assigned it to the cat now under notice; but the name is not available for either species, being preoccupied by Forster's *libyca*.

According to Cabrera, 1931, and Allen, 1939, *lybica* ranges from Morocco to Tunisia. In my conception it extends eastwards to Egypt, up the Nile and to Suakin, and to the west coast of the Red Sea. Hence the synonymy above quoted, including *maniculata*, *ruppelii*, and *dongolana* applied to Egyptian specimens, contains more names than were entered by those authors. Admittedly, my material consists mainly of single specimens from widely separated localities; but the differences between them are comparatively slight and not in my opinion of subspecific value.

Geographical Distribution.—The semi-desert districts of North Africa from Morocco, Algeria and Tunisia to Egypt up the Nile through Nubia to the Anglo-Egyptian Sudan, and eastwards to Suakin and Massowah and, according to Flower, the western coast of Sinai.

Diagnosis.—Intergrading with *F. l. sarda*, but readily distinguished on the average by its lighter, dominantly buff or sandy hue, matching its habitat, with less black in the general pelage above, paler with reddish spots below, paler, nearly uniformly ochreous ears, whiter face, and apparently slightly larger skull.

There is no topotype of this race in the British Museum, but a young adult skin from Gabes, in Tunisia (P. Spatz, 96.7.15.1), April 16, may be taken as representing typical *lybica* from Gafsa. The coat is in moult, with its contour hairs 33 mm. on the flanks, 48 mm. on the crest. The general colour above is

pale grey, speckled whitish and fuscous on the flanks, black and pale buff on the spinal area, which is moderately sharply defined, but owing to the comparative thinness of the contour hairs the upper side, especially the shoulders, neck and head, is suffused with the buff tint of the wool of the flanks and the rich ochreous tint of the wool of the spinal area. The backs of the ears are dull red, perhaps faded; the face is mainly whitish with a little red on the nose and tinged with grey on the cheeks, showing up the genal stripes. The stripes on the flanks are faint, dusky brown on the outer sides of the legs, the fronts of which are very pale cream grey, with the bracelets on the fore legs pronounced and the hind foot black to the hock. The tail above is like the spinal area, but without the ochreous wool, and its distal black and white stripes are strongly contrasted with its proximal portion. On the lower side, the chin and fore throat are white, with a red collar, the hind throat buff and also red-collared; the chest between the legs is white, passing posteriorly into buff, the spots being red; the abdomen posteriorly is white, but the genital area and the backs of the thighs, not the base of the tail, are rich rusty ochreous.

An adult ♀ skin from Oued Nça, Mzab country, Algerian Sahara (39.3653)[1] April 26, closely resembles the skin from Gabes in the coat, which is thin with the contour hairs on the flanks and crest about 35 and 50 mm. The general colour above is a little more sandy, or yellower, owing to the pale speckling of the contour hairs being a little finer and more buffy, not so white; the spinal area is equally well defined by its black and pale ochreous speckling, and the wool of the flanks and crest is very nearly the same tint, perhaps a shade richer, and being similarly exposed by the thinness of the contour hairs adds to the generally buffy aspect of the pelage. The backs of the ears are slightly brighter red; there is a little more buff on the face and cheeks and the lower side is richer, though overcast with white, and the spots are red. The stripes on the flanks are almost obsolete, and on the outer sides of the legs are a little less distinct, but the genal stripes, the two throat-collars, and the bracelets are as well defined and the same rich tint pervades the backs of the thighs.

A ♂ skin from Wadi Outras, north of Tiznit, about 100 miles south of Mogador, on the west coast of Morocco (R. Akroyd, 32.4.1.1), March, has the coat more luxuriant than in the skin from Gabes, the hairs of the flanks and crest being 35 and 50 mm. long and entirely concealing the wool. The general colour above very closely matches that of the skin from Gabes, but is a trifle darker owing to the pale areas of the contour hairs of the flanks being less white, slightly buffy, and of the crest a trifle richer. It is, on the other hand, a shade paler than the skin from the Mzab country, the pale areas of the contour hairs being a little lighter and more extensive; the wool and the backs of the ears are about the same as in the last. The stripes on the sides are very faint and on the outer side of the limbs weak, as in the Mzab skin; but the spots are obsolete on the under side, a character in which it differs from the other two skins in which they are conspicuous and red; the under side is tolerably uniformly cream buff, nearly as in the Gabes skin, paler and duller than in the Mzab skin,

[1] This cat, collected by Hartert and Hilgert, was exhibited in Tring Museum as *F. margarita*.

but, as in them, the backs of the thighs are richly tinted, the tint extending down to the foot along the inner side, but gradually fading.

This skin belongs beyond doubt to the pale sand-coloured North Saharan race of the species, and on that account is of particular interest from its locality, which is not far from Mogador, the type locality of *F. ocreata mauritana*, Cabrera, referred to above under *F. lybica sarda*. Akroyd tells me (*in litt.*) that the cat was killed in open undulating country, cut up by watercourses and sloping towards the sea. It was provided with very little scrub, but carpeted with aubretias and Spanish delphiniums and frequented by plenty of ground squirrels.

Three skins from Suakin (John Anderson), differing a little individually in tint and distinctness of pattern, are of special interest from their likeness to those above described. An adult ♂ from the Tamai Plain (4.8.2.13) is an almost exact match in every way of the skin from Tiznit, in Morocco, except that the coat is shorter, being about 26 mm. on the flanks and 35 mm. on the crest, and the ventral side is marked with red spots. It is also very like the skin from Gabes, in Tunisia, except that the coat is shorter, the pale speckling on the flanks slightly buffy, less clear whitish, with less black on the spinal area and the wool both dorsally and laterally less rich in hue. A second adult ♂ (7.4.3.1), from the same locality, has the coat longer, 30 and 44 mm., and the pale speckling clearer, less buffy than in the first described, thus still more closely resembling the skin from Gabes.[1] An adult ♀ (97.3.12.4), labelled merely Suakin, is practically indistinguishable in colour from the first described ♂; but a headless skin from Suakin (Penton, 93.10.15.1), although short-coated like 4.8.2.13, has the general tint clearer and whiter even than in 7.4.3.1, and the pattern is stronger than in the others, the buff stripes standing out more boldly on the paler ground colour. The difference between this skin and the first described Tamai skin is greater than the difference between the latter and the skin from Tiznit, in Morocco.

A youngish specimen (69.10.24.9) from Zoulla, near Massowah, shot in July by Blanford, who correctly, I think, identified it as *F. maniculata*, has a short, faded summer coat and closely resembles the buffy ♂ from Tamai, Suakin (4.8.2.13) in general colour, but has the lateral pattern comparatively strong, as strong as in Penton's skin from Suakin, although not thrown into such bold relief owing to the darker colour of the flanks. An adult ♀ (69.2.2.5), collected by Jesse in the Zoulla district, is in better coat than the last and differs from it in being generally greyer in tint owing to the more conspicuous black and white speckling in the pelage, especially on the spinal area, and has the stripes on the legs blacker and less red. It closely matches the skin from Gabes, Tunisia, and the ♀ skin from Suakin.

An adult ♂ from Shendy (39.1666), March 12, with a thick but rather short coat, 25 mm. on the flanks and 34 mm. on the crest, has the general colour above a little brighter and more buffy than in the skins above described with the spinal area more emphasised by black speckling, even a trifle more than in

[1] These ♂ specimens from the Tamai Plain are the two of which Anderson, under the numbers 75 and 85, gave the flesh measurements (*Mamm. Egypt*, p. 172, 1902).

the skin from Gabes, and the ears are a little paler and more ochreous; the pattern is very faint on the flanks and limbs, strong only on the tail and cheeks; the under side is mostly cream with a reddish collar on the hind throat.[1]

A youngish ♀ skin from Dueim (25.6.6.1), March 21, has the crest hairs 42 mm., a little longer than in the ♂ from Shendy and a little less black, but the ground colour and the ears are very nearly the same tint. It differs, however, strikingly from it, as well as from the other previously described specimens, including Penton's from Suakin, in the greater distinctness of its pattern, which consists of brownish streaks on the nape and transverse stripes on the body and limbs. This pattern is probably a mark of the immaturity of the specimen.

A youngish ♀ from Sennar (46.6.15.112) matches the adult ♀ from Suakin (97.3.12.4); but a kitten from the same locality (46.6.15.113) is darkish grey above, like the bush-cats, although whitish below.

A specimen (22.12.28.1), from the Setit River, a tributary of the Atbara, Anglo-Egyptian Sudan, about 36°E. and 14°N., close to the north-western Abyssinian boundary, is uniformly sandy-coloured, speckled buffy white and fuscous on the flanks, black and buff on the spinal area and with pale buffy ears; there are no stripes on the body or thighs and those on the fore legs are faint; the hind feet are black to the hock.[2]

Measurements

Only four of the skins assigned to *F. lybica lybica* have flesh measurements. With these are included a specimen, coloured like a bush-cat, from Nakheila which is described below (p. 68), but left unidentified.

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
	F. lybica lybica		in.	in.	in.	in.
♂ ad.	Tamai Plain, Suakin . .	4.8.2.13	23⅛	14⅛	5⅜	—
♂ ad.	,, ,, ,, . .	7.4.3.1	22⅜	15	5⅛	—
♂ ad.	Shendy, Sudan . . .	39.1666	19⅜	13⅜	5⅛	2⅛
♀ ad.	Mzab country, Algerian Sahara	39.3653	22	12	5	2⅜
	F. lybica subspecies?					
♀ ad.	Nakheila, Atbara River . .	4.11.3.14	18⅜	9⅜	4⅛	2⅛

Skull.—The average condylobasal length of seven adult ♂ skulls is 91½ mm., a little longer than that of the four adult ♂ skulls of *sarda*. There are some interesting individual differences in the skulls in the British Museum. The one from Mettamer, or Métameur (19.7.7.2978), is just adult, has feebly developed occipital and sagittal crests, the postorbital area only a little constricted, the

[1] Two additional specimens procured by N. C. Rothschild at Shendy are very different from the above described, one being a red kitten, the other a dark grey adult ♀, with fairly well-pronounced pattern and short, thin winter coat. Both are regarded as feral house-cats (see p. 16).

[2] It is impossible to describe this specimen in the same detail as the rest because it is exhibited with other mammals in a case to illustrate colour adaptation to desert conditions.

SKULL MEASUREMENTS OF *FELIS LYBICA LYBICA* AND OF TWO SPECIMENS OF DOUBTFUL SUBSPECIES FROM THE UPPER NILE

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	pm^4	m_1
	F. l. lybica		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Métameur, Tunisia	19.7.7.2978	99	93	68	46	35	18	23	23 : 16	65	12	9
♂ ad.	Assouan, Egypt	97.3.12.13	99	91	73	46	33	16	23	20 : 14	68	11	8
♂ ad.	Tamai Plain, Suakin	4.8.2.13	102	92	71	45	36	18	25	20 : 14	67	12	9
♂ ad.	,, ,, ,,	7.4.3.1	98	90	66	44	35	17	24	22 : 17	65	11	8
♂ ad.	Erkowit, south of Suakin	15.11.19.1	100	91	70	42	29	18	23	21 : 15	66	11	8
♂ ad.	Shendy Sudan	39.1666	98	92	65	41	31	17	24	20 : 15	66	12	8½
♀ ad.	Oued Nca, Mzab Country	39.3653	95	88	64	44	35	17	21	20 : 14	62	10	8
♀ yg. ad.	Gabes, Tunisia	96.7.15.1	87	78	63	43	34	18	22	19 : 14	58	10	7
♀ yg.	Zoulla, Eritrea	69.10.24.9	88	81	59	43	33	14	22	18 : 15	58	11	8
♀ ad.	,, ,,	69.2.2.5	93	87	64	43	31	16	22	21 : 15	63	11	9
	F. lybica subspecies												
♀ ad.	Nakheila on Atbara River	4.11.3.14	86	78	61	42	32	15½	20	19 : 15	56	10	8
♀ ad.	Shabluka Hills, north of Omdurman	8.6.15.3	87	79	63	42	31	16	21	20 : 15	56	10	8

temporal ridges 15 mm. apart, and the canine small, only just over 4 mm. in basal longitudinal diameter. The skull from Assouan (97.3.12.1 a), which has no skin, is fully adult and, like the last, has the occipital and sagittal crests small, the temporal ridges are strong and 11 mm. apart, but the zygomata are exceptionally wide and the bullae are noticeably smaller than in the skull from Mettamer. The skull from Tamai plain, Suakin (4.8.2.13), has the occipital and sagittal crests well developed, the sagittal being 5 mm. high, but the postorbital area is wide and the temporal ridges 10 mm. apart; the forehead is higher than in the other skulls owing to air-cell inflation, and the facial profile consequently more steeply sloped; the bullae are small, as in the Assouan skull. In the other skull from Tamai (7.4.3.1), on the contrary, the bullae are much longer, the sagittal crest is only 2 mm. high, the ridges are 15 mm. apart, and, although the skull is younger, the teeth are smaller, the canine being only 4 mm. instead of 5. These differences, especially those of the bullae, in two skulls from the same locality are interesting. The skull from Erkowit (15.11.19.1), which has no skin and is provisionally included, is well moulded and unique in the race for the junction of the temporal ridges at the suture and their continuation over the parietals as a very low sagittal crest rising to 5 mm. posteriorly; the occipital crest is also well developed, the postorbital area is distinctly constricted, and although the teeth are somewhat worn the canines are 5 mm. in basal diameter.

Of the ♀ skulls, the one from the Mzab country, Algerian Sahara, is exceptionally large, thus confirming the flesh measurement. Its muscular moulding is negligible, the occipital and sagittal crests being poorly developed, its postorbital area hardly constricted, and the muscular ridges 24 mm. apart at the suture; the teeth are small, the basal diameter of the canine being only $3\frac{1}{2}$ mm. But the skull from Zoulla, Massowah (69.10.24.9), is quite young, as shown by its open sutures, narrow zygomata and small postorbital processes, and with growth would probably have reached, perhaps surpassed, the size of the one from the Mzab country. The remaining ♀ skulls, ranging from Gabes, in Tunisia, to Shendy and Dueim, are very much alike in size and other features, all being better developed than the ♀ from the Mzab district, the muscular ridges varying from 15 to 21 mm. apart. In the skull from Dueim the canine is only 3+ mm. in basal diameter; in the rest it is about 4 mm.

Specimens in the Collection

F. l. lybica

♂	Wadi Outras, north of Tiznit, west coast of Morocco	R. Akroyd [C & P]	32.4.1.1
♀ mtd.	Oued Nça, Mzab country, Algerian Sahara (E. Hartert)	Rothschild Bequest	39.3653
♀	Gabes, Tunisia	Purchased	96.7.15.1
♂	Métameur, Tunisia		19.7.7.2978
♂ skull	Assouan, Egypt	Dr. J. Anderson [C & P]	97.3.12.1a
2 ♂	Tamai Plain, Suakin (J. Anderson)	Mrs. J. Anderson [P]	4.8.2.13, 7.4.3.1

	Suakin	Dr. J. Anderson [C & P]	97.3.12.4
♀	,,	R. H. Penton [C & P]	93.10.15.1
♂	Erkowit, south of Suakin	A. L. Butler [C & P]	15.11.9.1
♂	Shendy, Sudan	Rothschild Bequest	39.1666
Mtd.	Setit River, Atbara River	Count J. Potocki [C & P]	22.12.28.1
	Dueim, White Nile (H. L. Brocklehurst)	Wellcome Tropical Res. Laboratory [P]	25.6.6.1
ct juv.	Sennar, Sudan		46.6.15.112–113
	Zoulla, nr. Massowah, Eritrea	Dr. W. T. Blanford [C & P]	69.10.24.9
	Zoulla district (W. Jesse)	Purchased	69.2.2.5

F. l. subspecies

Shabluka Hills, north of Omdurman (A. L. Butler)	Major S. S. Flower [P]	8.6.15.3
Nakheila, Atbara River	Hon. N. C. Rothschild [C & P]	4.11.3.14

Felis lybica, subspecies

A fully adult ♂ (8.6.15.3), captured in the Shabluka Hills, north of Omdurman, that lived for about one year in the Zoological Gardens, Cairo, has the teeth greatly worn apparently from biting steel rods rather than from age. The coat is full and long, 31 and 46 mm., in November. The general colour above is darkish buffy grey, darker than in the skins assigned to typical *lybica*, especially on the face, with the spinal area dull ochreous and black, the wool on the flanks brightish buff, and on the crest dull ochreous; the ears, although much rubbed, appear to have been deep rusty brown, darker than in typical *lybica*; the pattern is mostly suppressed; the under side is buff overcast with white, and the hind feet are black to the hock.

This skin, which has no flesh measurement, looks like that of a pure-bred wild cat. Presumably its darker colour is associated with its habitat in the hills, where there is probably more vegetation and moisture than at the lower levels where typical *lybica* occurs. The skull has the bullae much larger than in the feral ♂ domestic cat from Wady Natron, in Lower Egypt, referred to above (p. 15), and is about the same length. It is moderately well moulded, but has poorly developed occipital and sagittal crests considering its age.

An adult ♀ skin (4.11.3.14) from Nakheila, on the Atbara, February 4, has a long full coat, 33 and 42 mm., and the general colour darkish grey above, as in the bush-cats of this species, recalling that of the adult ♂ skin of *ocreata* from Tigré, but the face is not so pale and the ears are unusually dark, being dull grey-brown and matching the head, as in the greyish skin from Shendy (1.5.5.13) regarded as a feral house-cat (p. 16); the spinal area is ochreous and black; the wool on the flanks is rich buff, on the crest rich ochreous; the pattern on the body above is practically obsolete, black but not strong on the limbs, and black below; the hind throat and the rest of the under side are buffy. The skull is about the same size as in the last, but, although a good deal younger, with the temporal ridges 17 mm. apart, has the occipital and sagittal crests better developed, and the orbital portions of the zygomata more salient.

Considering that Nakheila, as I learn from Major S. S. Flower, is in the desert, the dark hue of this cat is puzzling, if it is pure bred. It is much darker than the sandy-hued cat from the Setit River, higher up the Atbara, which is referred to typical *lybica* (p. 65).

Felis lybica ocreata, Gmelin

1791. *Felis ocreata*, Gmelin, Anhang zu Bruce Reisen, 2, pp. 27 and 79 (Ras-el-Feel, North Abyssinia).
1792. *Felis Lynx nubiensis*, Kerr, Anim. King., p. 156 (Ras-el-Feel, North Abyssinia).
1824. *Felis caligata*, Temminck, Mon. Mamm., 1, p. 123 (Ras-el-Feel, North Abyssinia); Blanford, Obs. Geol. Zool. Abyssinia, p. 228, 1870.
1902. *Felis lybica*, Anderson and de Winton, Mamm. Egypt, p. 171 (in part, not *F. lybica*, Forster).
1904. *Felis ocreata ocreata*, Schwann, Ann. Mag. Nat. Hist., 7th ser., 13, p. 426; Heller, Smiths. Misc. Coll., 61, pp. 14–15, 1913.
1925. *Felis ocreata maniculata*, De Beaux, Atti. Soc. Ital. Sci. Nat., 64, p. 212 (not *maniculata*, Temminck and Cretzschmar).
1939. *Felis lybica ocreata*, G. M. Allen, Bull. Mus. Comp. Zool., 83, p. 238 (in part, excluding synonymy).
1944. *Felis lybica ocreata*, Pocock, Proc. Zool. Soc., 114, p. 67.

Note on the Synonymy.—Gmelin gave the name *Felis ocreata* to the cat from Ras-el-Feel described and figured by Bruce as the "Booted Lynx" (*Travels, etc.*, 5, p. 146, 1790). Under *Felis Lynx nubiensis* Kerr cited the names of three different cats. The first was the Nubian Caracal of Buffon (*Suppl. Hist. Nat.*, 3, p. 232, 1772, not 5, p. 224, as quoted by Kerr) which Buffon described on information received from Bruce, who saw at Meroe a specimen, obviously a genuine Caracal. The second was the Lybian Lynx of Pennant (*Quadr.*, p. 284, No. 173 B, 1781), which is typical *F. lybica*, Forster. The third was the Booted Lynx of Bruce. This has been selected as the type because Kerr's diagnosis was derived practically *verbatim* from Bruce's text. Temminck used the name *Felis caligata* in a comprehensive sense to include cats of this species ranging from North to South Africa. But since the first name quoted in his synonymy was the Booted Lynx, which suggested the name *caligata*, Blanford's application of the latter to the cat he shot in northern Abyssinia was amply justified.

G. M. Allen's conception of this race, derived from earlier authors, covered the bush cats and semi-desert cats of Abyssinia and Egypt, involving a long list of synonyms published later than *ocreata*. Under that name he entered *maniculata*, *ruppelii*, and *dongolana*, ascribed above to *lybica*, as well as *guttata*, Herman, 1804, *bubastis*, Hemprich and Ehrenberg, 1832, given to the sacred cat of the ancient Egyptians, and *pulchella*, Gray. The description of *guttata* does not apply to any cat of this species, the type of *pulchella* is a feral house-cat (see above, p. 15), and the only skull of the mummy cat known to me is much too large to be referred to either of the races *lybica* or *ocreata* as here understood.

Geographical Distribution.—Abyssinia.

Diagnosis.—Distinguished from typical *lybica*, although intergrading with it, by the dominant tint of the ground colour above being grey with more black speckling and a reddish or yellow wash, not so sandy buff in adaptation to

desert or semi-desert conditions. The general colour above is more like that of *sarda*, but is paler grey, with less black speckling, especially on the sides of the body, the ears are paler and the face noticeably whiter. There is evidence also that the skull is a little larger, sex for sex, than in either of the preceding two North African races, particularly *sarda*.

This diagnosis is derived from the descriptions of three examples given by Bruce, Blanford, and de Beaux respectively, and from a specimen in the British Museum which has been compared with the specimens assigned to *libyca* and *sarda*.

Bruce briefly described his "Booted Lynx", the type of *ocreata*, as being 22 inches long from the nose to the anus, dirty grey in colour above, dirty white, with red spots on the belly, the nose reddish brown, the backs of the ears the same, but a little darker, and the under side of the feet black. There is no reference to pattern on the body, apart from the spots below. The locality, Ras-el-Feel, as shown by the map of Bruce's *Travels*,[1] is about 40 miles north-west of Lake Tana, in Abyssinia, but is not entered in modern atlases in which the only locality of that name is in Darfur. This apparently has been a source of some confusion regarding the colour of the "Booted Lynx".

Bruce's account of the habits and habitat of this cat is also important. It lives in company with the elephant and rhinoceros, feeding on the guinea-fowl found in the thickets and bushes. It hides in the bushes; but in the "fly-season" retreats to holes in the ground, and when pursued climbs high trees. This account attests tolerably luxuriant vegetation and abundance of rain, not semi-desert conditions.

Blanford killed an adult ♂ at Adigrat, Tigré Province, 8,000 ft., north-east of Ras-el-Feel, in Abyssinia. His opinion that this cat represents the Booted Lynx and that the latter is the type of *F. caligata* may be accepted without qualification. He drew attention to the luxuriance of the winter coat in April, stating that the hairs on the back were $2\frac{1}{2}$ inches (62 mm.) long; the general colour above was somewhat rufous grey, darker towards the centre of the back, and rufous white below. Comparing this cat with the specimen he collected at Zoulla, near Massowah, and identified as *Felis maniculata* (see above, p. 64), he remarked that the two are so entirely different that no naturalist of that period would consider them to belong to the same species.

De Beaux had an adult ♂ from Azozo, in Gondar, north Abyssinia, which, erroneously in my opinion, he identified as *Felis ocreata maniculata*. He commented on the large size of the skull, gave some dental measurements, and described the colour above as light yellowish grey.

Blanford's skin (69.10.24.8) from Tigré, 8,000 ft., April, has a full, long coat, 40 mm. on the flanks, 60 mm. on the spinal area; the general colour above,[2]

[1] I am indebted to Mr. F. Allen of the Royal Geographical Society for this information. The account of this cat quoted above is taken from the third edition of the *Travels*, 7, p. 263, 1813, the only copy of the work I have seen.

[2] There is no trace of the "rufous" tinge mentioned by Blanford. It has either entirely faded or was due, as I suspect, in the freshly killed specimen to exposure of the bright-coloured wool beneath the contour hairs. The yellowish tinge in De Beaux's specimen may have been due to the same cause.

except on the spinal area, is clear silvery grey, paler than in *sarda* owing to less black speckling, especially on the lower half of the sides; the spinal area is dark, the hairs being extensively black with rich buff speckling; the summit of the wool is pale buff on the flanks, ochreous on the spinal area from the shoulders to the tail; the crown of the head is grey, not darker than the flanks, although more finely speckled; the backs of the ears are about the same tint as in typical *lybica*, paler than in *sarda*; there is some reddish ochreous on the nose, but the face is much paler than in *sarda*, especially between the eyes and on the cheeks, the latter being buffy white up to the upper genal stripe, the lower being obsolete; there is no perceptible pattern on the head, nape or shoulders, that on the flanks is so faint as to be practically negligible, and on the limbs, which are buffy grey in front, the stripes, apart from the bracelet, are fuscous and weak; only the end of the tail is strongly striped; the under side has the chin and interramal area white, the rest buff, with very faint chest spots; but this hue is intensified, but not markedly, round the genital area, on the backs of the thighs, down the inner side of the hind legs, and on the base of the tail.

The skin of a young adult specimen alleged to be ♂ (K. M. Guichard, 46.93) from Debra Sina–Dessie Road, near the Robi River, Ethiopia (=Abyssinia), 4,000–5,000 ft., in its generally grey hue above, with darker, richer tinted spinal area and buffy white under side, resembles the ♂ skin from Tigré, but differs in a few particulars. The mid-winter coat, December 29, is shorter, the flank hairs being 28 mm. and those on the crest 40 mm.; the head has more pigment, the area between the eyes and the cheeks being buff, not so white, and the ears darker; the pattern on the flanks is more conspicuous, especially posteriorly, and passes inferiorly into blackish spots on the belly and chest, and the stripes on the outer side of the legs, particularly the fore leg, are also stronger. These differences in the coat colour and pattern are no doubt partly attributable to season, altitude, and age.

The male skull from Adigrat, in Tigré, North Abyssinia (69.10.24.8), regarded from its distribution as typical *ocreata*, although only just adult, has the occipital crest strongly developed, the sagittal crest 6 mm. high, and the temporal ridges 11 mm. apart at the suture, and meeting in a point near the middle of the parietals; the interorbital area is unusually flat owing to the considerable development of air-cells in front, making this area prominent and giving the nasals an abrupt downward slope. The large size of this skull is of interest in connection with the dimensions given by de Beaux of the skull of his male specimen, referred to above, from Azozo, in Gondar. In this the condylobasal length was 97½ and the zygomatic width 74½ mm., both dimensions exceeding those of any skulls of cats of this species from North Africa.

The skull of the alleged ♂ from near the Robi River differs from the Adigrat skull in being shorter, having the anterior portion of the frontals less inflated with air-cells so that the summit of the muzzle is not so steeply sloped. The maxillary and interorbital areas are narrower and the width across the post-orbital processes is 49 mm., as opposed to 51 mm.; but the cranial portion is practically as wide everywhere, being feebly muscularly moulded, the weak temporal ridges being 18 mm. apart at the suture and forming an indistinct

lyrate area on the parietals, the sagittal crest is only about 2 mm. high and the occipital crest is much less salient. These features, in which it differs strikingly from the ♂ skull from Adigrat, although not much younger, give it all the appearance of being ♀. The bullae are slightly less inflated, the distance between them being 10 mm. as opposed to 7½ mm. in the Adigrat skull. A rather noticeable difference in the teeth is the reduction in size of the inner lobe (protocone) of pm^1, this tooth being 5 mm. wide in front, as opposed to 6 mm. in the Adigrat skull.

Specimens in the Collection

♂	Adigrat, Tigré, N. Abyssinia	Dr. W. T. Blanford [C & P]	69.10.24.8
♂?	Debra Sina-Dessie Road, near Robi River, Abyssinia	K. M. Guichard [C & P]	46.93

Felis lybica bubastis, Hempr. and Ehr.

1832. *Felis bubastis*, Hemprich and Ehrenberg, Symb. Phys. Mamm. dec. 2, (Egypt); Pocock, Proc. Zool. Soc., 114, p. 67, 1944.

Diagnosis.—This sacred cat of the ancient Egyptians, as here identified, is distinguished from the existing North African races of *lybica*, namely *sarda*, *lybica*, and *ocreata*, by the considerably larger size of the skull, which is a trifle longer even than the two exceptionally long skulls of the South African race *cafra* (p. 102), the teeth being about the same size as in the latter.

This race is provisionally admitted on the evidence of a skull in the British Museum (90.3.7.1), labelled "Mummied Cat". It was one of a large number (19 tons) sent over to England for manure.

This skull, obviously that of an oldish ♂, of which the measurements are given in the table (p. 59), is exceptionally well moulded. The temporal ridges meet at the suture and are continued over the parietals as a low ridge, which posteriorly rises into a high sagittal crest; the occipital crest is well developed, the zygomatic arches salient, the postorbital area constricted and the orbits on each side completed by the junction of the frontal and malar postorbital processes.

This skull was not identified by Thomas. I refer it to *Felis lybica* because of its size and general shape, especially the salience of the orbital and temporal areas of the zygomata which gives it the wide look characteristic of the skulls of that species and of *silvestris*, distinguishing them readily as a rule from the narrower more elongated skulls of typical *F. chaus*. It is, moreover, considerably shorter in its total and condylobasal lengths than adult ♂ skulls of *F. chaus nilotica*, the Egyptian race of the Jungle Cat (see p. 159), although about as wide, and has the upper carnassial tooth (pm^4) much smaller. In its lengths it is nearly the same as the only adult ♀ skull of *F. chaus nilotica* entered on the table (p. 160), namely the one from Akmin (92.5.22.1), but is much wider across the zygomata and has pm^4 smaller. In all its dimensions, nevertheless, and in the size of its teeth, it agrees tolerably closely with an adult ♂ skull of the Sind race, *F. chaus prateri* (15.11.1.67).

In view of the above-stated facts the following possibilities connected with the skull suggest themselves. It may represent a big Egyptian wild race of *F. lybica*, now extinct. That is the possibility here provisionally adopted. On the other hand, since the sacred and "mummied" cat to which it belonged may have been a tame specimen bred and reared in captivity, it is conceivable that the peculiarities of the skull are due to its being that of a hybrid between *F. lybica* and *F. chaus*; or, indeed, it may have belonged to a pure-bred stock of *chaus*, domesticated for several generations, in which the skull and teeth were reduced in size by conditions of captivity, exactly as has taken place in some of our domestic cats; and since it is known that rearing from early cubhood in menageries has the effect of expanding the zygomata, e.g. in lions, the same phenomenon may possibly have occurred in the skull under discussion.

Specimen in the Collection[1]

Skull	Egypt	Professor G. B. Howes [P]	90.3.7.1

Felis lybica lynesi, Pocock

1923. *Felis ocreata*, Thomas and Hinton, Proc. Zool. Soc., p. 253 (in part, excluding the specimen from Jebel Marrah; not *ocreata*, Gmelin).

1925 ?*Felis haussa*, Thomas, Ann. Mag. Nat. Hist., 9th ser., 16, p. 188. (The specimens from Tchsiderak in Aïr which are not *F. l. haussa*, Thomas and Hinton as recorded below.)

1944. *Felis lybica lynesi*, Pocock, Proc. Zool. Soc., 114, p. 68 (35 miles north of El Fasher in Darfur).

Geographical Distribution.—The deserts of Darfur.

Diagnosis.—A desert race paler in general colour than *F. lybica lybica*, with the ears paler and more ochreous, as in the specimen from Shendy, and the skull smaller.

Colour.—The type, young adult ♂ (23.1.1.65), February 5, has the coat tolerably full, 35 mm. long on the flanks and 45 on the crest; the general colour above is very pale creamy white, speckled with black on the back and with fuscous on the sides, there being no appreciable buff except on the spinal area, which has comparatively little black speckling; the wool on the flanks is pale buff, on the spinal area darker buff; the pattern is everywhere almost suppressed, except the "bracelet" on the fore leg and the bands on the tail; there are no stripes on the head, nape or shoulders, those on the flanks are scarcely perceptible, and on the outside of the fore legs faint; the ears behind are light ochreous with a brown pencil; the lower side is superficially white from the chin backwards, but on the chest and abdomen the hairs are buff at the base, and there are no spots; the backs of the thighs are buff and the hind foot is black up to the hock.

A young ♂ (23.1.1.64) from El Fasher, February 8, has the coat shorter,

[1] The author did not take into consideration the many specimens of mummied cats in Professor Flinders Petrie's collection which was presented to the Museum in 1904.

30 mm. on the flanks and 38 on the crest, the ground colour is buff and darker, and the spinal area ochreous with more black speckling; but it differs most strikingly from the type in having the pattern everywhere pronounced, pale brownish on the head, nape, shoulders and flanks, blacker on the legs and red below; the backs of the thighs are richer ochreous, but the black on the hind foot does not spread much above the pads. The comparative distinctness of the pattern in this specimen and the restriction of the black on the hind foot to the sole are probably juvenile characters. The same explanation may apply to its generally richer colour. This skin is an almost exact match of the immature skin from Ducim, assigned to *F. l. lybica* (see p. 65), but the pattern is everywhere more pronounced.

Skull.—The young adult male skull of the type, with a total and condylobasal length of 93 and 85 mm., is shorter than six adult male skulls of typical *lybica* from Tunis, Assouan, Suakin, and Shendy, in which the total length ranges from 98 to 102 mm., with an average of 99½, and the condylobasal length from 90 to 93 mm., with an average of 91½. The skull of the young male from El Fasher, with a condylobasal length of 78 mm., calls for no further comment. For skull-measurements see p. 77.

According to the information kindly supplied by Mr. Willoughby Lowe these two cats were trapped in the open plain consisting of desert sand almost without vegetation. They feed upon gerbils and share the burrows made by the fennec foxes. The habitat is clearly quite different from that of the type of *F. l. lowei*, from Jebel Marra, described below (p. 76).

Felis lybica, subspecies

Representing the same, or a very closely related, race are three specimens collected at Tchsiderak, in Aïr or Asben, 2,300 ft., by Angus Buchanan. They were identified by Thomas in 1925 as *Felis haussa*, although they contradict the definition of the latter given by him and Hinton in 1921.

A young adult ♀ (25.5.12.7), January 11, has the coat 23 and 37 mm., decidedly shorter than in the type of *lynesi*; the ground colour is very nearly the same, but the spinal area is better defined by having more black in it; the wool on the flanks is very pale buff, on the crest pale ochreous, and the pattern is much more apparent, being intermediate in distinctness between the pattern of the two skins from Darfur, and the black on the hind foot is restricted to its lower part, as in the young male from that district. This last character, like the comparative distinctness of the pattern, is no doubt due to the specimen being not quite adult.

A young adult ♂ (25.5.12.6), January 12, has the coat 28 and 36 mm., the colour and the wool on the flanks a little deeper buff, but there is much less black on the spinal area, the pattern above is a little fainter, but below a little stronger. Another male (39.1671) has the coat 28 and 42 mm., the ground colour and the wool still a little deeper, the spinal area still fainter and the pattern below still stronger than in the other. The three specimens have the backs of the ears uniformly ochreous, the face largely white, with the usual four

short brown streaks above the eyes, the area between the eyes almost unspeckled, a brown streak running from the eye to the muzzle on each side, two reddish genal stripes, and at least a couple of collars on the throat; all these marks being more emphasised than in the type of *lynesi*, but practically the same as in the young ♂ from Darfur.

Flesh Measurements

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
	F. l. lynesi		in.	in.	in.	in.
♂ yg. ad.	El Fasher, Darfur (type)	23.1.1.65	20	13+	$5\frac{1}{5}$	$2\frac{1}{5}$
	F. l. subspecies					
♂ ad.	Tchsiderak, Aïr . .	25.5.12.6	19	$14\frac{1}{2}$	5	$2\frac{1}{2}$
♂ ad.	,, ,, ,, . .	39.1671	$18\frac{2}{5}$	$11\frac{2}{5}$	$4\frac{4}{5}$	$2\frac{1}{5}$
♀ yg. ad.	,, ,, ,, . .	25.5.12.7	$16\frac{4}{5}$	13	$4\frac{4}{5}$	$2\frac{1}{5}$

Skull.—The skull of the young adult ♂ (25.5.12.6) seems to have attained nearly its full length, but is weakly moulded, its temporal ridges being 18 mm. apart and its sagittal crest only 3 mm. high. Its total and condylobasal lengths are 98 and 90 mm., a little longer than in the type of *lynesi*, and very nearly as long as in the ♂♂ of typical *lybica* referred to above. Its carnassials are 11 and 9 mm. and its upper canine 5 mm. The skull assigned to the skin (39.1671), which is certainly ♂, has all the characters of a ♀. It is adult, with the basioccipital suture closed, but its condylobasal length is barely 81 mm., 9 mm. less than in the ♂ skull (25.5.12.6), whereas its postorbital width is 35 mm., 2 mm. wider than in the ♂ skull, although its temporal area is narrower, 14 mm. wide, with the sagittal crest at most 2 mm. high. The teeth, too, are smaller, the carnassials being $10\frac{1}{2}$ and 7 mm., and the canine 4 mm. thick. I do not believe the skull belongs to the skin and have treated it as ♀. The skull of the young adult ♀ (25.5.12.7) has the condylobasal length 78 mm., the postorbital area 35 mm., as in the last, the temporal area 23 mm. wide, the carnassials 9 and 7 mm., and the canine 3 mm. thick.

For skull measurements see p. 77.

Specimens in the Collection

F. l. lynesi

♂	El Fasher, Darfur (W. P. Lowe)	Admiral H. Lynes [P]	23.1.1.65 type
♂	,, ,, ,,	,, ,,	23.1.1.64

F. l. subspecies

♂, ♀	Tchsiderak, Aïr or Asben	Angus Buchanan [C & P]	25.5.12.6–7
♂	,, ,, ,,	Rothschild Bequest	39.1671

Felis lybica lowei, Pocock

1923. *Felis ocreata*, Thomas and Hinton, Proc. Zool. Soc., p. 253 (in part, i.e. the skin from Jebel Marrah; not *ocreata*, Gmelin).

1944. *Felis lybica lowei*, Pocock, Proc. Zool. Soc., 114, p. 68 (Jebel Marrah, 4,000 ft., Darfur).

Geographical Distribution.—Unknown with certainty, apart from the type locality, but possibly extending to Fort Lamy on the Lower Shari River.

Diagnosis.—A bush-cat, clear dark grey in colour on the flanks, and distinguished from typical *ocreata*, as above defined, at least by its much thinner and shorter winter coat, and apparently by its smaller skull and teeth; and from *sarda* by its paler colour, especially of the ears, which are ochreous and strongly contrasted with the head.

Colour.—The type, an adult ♀ (23.1.1. 66), has the winter coat (April 11) thin and short, only 30 mm. on the flanks, 35 mm. on the spinal area, and 16 mm. on the tail. The colour of the upper side throughout is darkish grey, with a slight olivaceous cast, the contour hairs being very finely and closely speckled with black and buffy white, with the spinal band a little blacker; the wool on the flanks is pale greyish buff and only a little brighter on the spinal crest; the ears, however, are bright ochreous buff, strongly contrasted with the head; the stripes on the flanks are only just perceptible, but are stronger on the limbs, the fore legs having the normal two black "bracelets" on the inner side; there are no stripes on the shoulders or nape and scarcely a trace on the head, except the two normal abbreviated streaks above the eyes and the two red genal stripes; the two patches between the eyes are conspicuous and white, and there is some reddish on the muzzle; the lower side is mostly white, but the hind throat is buff with two brownish collars, the ventral spots are brown and reddish, there is some ochreous on the backs of the thighs, but not on the base of the tail, which has at most a couple of stripes in front of its black tip, and the hind foot is normally blackish to the hock behind.

The measurements are: head and body, 22 in.; tail, 13¼ in.; hind foot, 5 in.; ear, 2⅕ in.

There is nothing to be noted in the general form of the skull, of which the measurements are given in the table (p. 77).

According to Willoughby Lowe's information this cat was "killed near Kallokitting", a district consisting of "granite boulders with considerable vegetation and moisture".

Provisionally referred to the same race is a ♂ skin in the British Museum (36.2.2.2), collected by Dr. Malbrant, at Fort Lamy on the Lower Shari River, Lake Chad, some 600 miles almost due west of Jebel Marrah. It has no skull and only differs from the type of *lowei* in being just a shade more buffy, and therefore slightly less grey above. The measurements of the flat skin are: head and body, 23½ in.; tail, 13½ in.; closely agreeing with those of the type.

SKULL MEASUREMENTS OF THE FOUR RACES *FELIS LYBICA LOWEI, LYNESI, HAUSSA,* AND *FOXI*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	pm^1	m_1
	Felis lybica lowei		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♀ ad.	Jebel Marrah, Darfur (type)	23.1.1.66	90	82	61	33	16	22	20 : 15	57	10	$7\frac{1}{2}$
	Felis lybica lynesi											
♂ yg. ad.	El Fasher, Darfur (type)	23.1.1.65	93	87	62	35	17	22	20 : 15	60	11	8
♂ yg. ad.	Tchsiderak, Aïr . .	25.5.12.6	98	90	65	33	18	23	20 : 16	64	11	9
♂ ad.	,, ,, ,, . .	39.1671	92	81	65	35	17	21	20 : 15	59	$10\frac{1}{2}$	7
♀ yg. ad.	,, ,, ,, . .	25.5.12.7	86	78	58	35	15	20	18 : 15	56	9	7
	Felis lybica haussa											
♂ ad.	Zinder, North Nigeria .	21.2.11.16 (type)	86	80	—	—	—	—	—	—	10	$7\frac{1}{2}$
♀ ad.	Farniso, Kano, N. Nigeria	21.2.11.17	80	75	57	30	$13\frac{1}{2}$	19	18 : 14	53	10	$7\frac{1}{2}$
♀ ad.	Dan Kaba, N. Nigeria .	39.1672	83	76	57	33	14	19	19 : 15	54	10	7
	Felis lybica foxi											
♂ ad.	Kabwir, Bauchi Prov., N. Nigeria . . .	13.9.9.1	98	90	67	33	20	24	20 : 16	65	11	9
♂ yg. ad.	Kabwir Bauchi Prov., N. Nigeria . . .	13.2.5.3	93	87	67	34	17	25	22 : 17	62	12	9

Specimens in the Collection

♀	Jebel Marrah, Darfur, 4,000 ft. (W. P. Lowe)	Admiral H. Lynes [P]	23.1.1.66 (type)
♂	Fort Lamy, Lower Shari River, Lake Chad	Dr. Malbrant [C & P]	36.2.2.2

Felis lybica haussa, Thomas and Hinton

1921. *Felis haussa*, Thomas and Hinton, Novitat. Zool., 28, p. 342 (Zinder, some 300 miles due south of Aïr).

1925. *Felis haussa*, Thomas, Ann. Mag. Nat. Hist., 9th ser., 16, p. 188 (in part, i.e. the specimen from Farniso, near Kano, Northern Nigeria, not the specimens from Tchsiderak, in Aïr).

1938. *Felis ocreata haussa*, Pocock, Ann. Mag. Nat. Hist. (11), 1, p. 472 (excluding specimens from Tchsiderak).

1944. *Felis lybica haussa*, Pocock, Proc. Zool. Soc., 114, p. 70.

Geographical Distribution.—Zinder in French W. Africa and Farniso, near Kano, Northern Nigeria.

Diagnosis.—A semi-desert cat like typical *lybica* and *lynesi*, and resembling them in its general sandy hue, but distinguished from all the races of the species by its noticeably smaller skull.

Colour.—The type, an oldish ♂ (Buchanan, 21.2.11.16) from Zinder, 1,500 ft., February 16, is an almost exact match in colour and pattern of the young adult ♂ from Tchsiderak (25.5.12.6).

An adult ♀ (21.2.11.17) from Farniso, 1,700 ft., near Kano, in North Nigeria, about 100 miles south of Zinder, December 22, is greyer than the type, not so buffy above, and has darker wool. Another adult ♀ (39.1672), from Dan Kaba, 1,520 ft., also in North Nigeria, May 11, has the coat thin and short, 25 and 40 mm. long, exposing the buff tint of the wool; it is a little lighter than the type because of the scantier black speckling of the contour hairs and the pattern is absent except for faint stripes on the outer sides of the legs and collars on the throat. A kitten from Farniso (21.2.11.18) differs from the adults in being darker above, with the ears dark brown and brownish stripes on the head and flanks, stronger stripes on the legs, the genal stripes and collars brownish, the spots on the belly black, all these being reddish in the adult, and the black on the hind foot, as in all immature skins of the species, restricted to the area of the pads.

In these external characters, including the flesh measurements, these specimens closely resemble those from Air, and since the measurements were taken by the same collector they may be regarded as strictly comparable.

Skull.—But the skulls of *haussa* are decidedly smaller sex for sex. The skull of the type, an oldish ♂, is well moulded, with its temporal area 10 mm. wide and salient zygomata, has its total and condylobasal lengths 86 and 80 mm., 10 mm. shorter than the young adult ♂ skull from Aïr; its teeth, too, are smaller, the upper and lower carnassials being 10 and 7½ mm. and the upper

MEASUREMENTS

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
			in.	in.	in.	in.
♂ ad.	Zinder . (type)	21.2.11.16	18⅘	10⅕	4⅗	2⅛
♀ ad.	Dan Kaba . .	39.1672	17	11⅕	4⅛	2⅛
♀ ad.	Farniso . . .	21.2.11.17	16	9½	4	2+
♀ yg.	,, . . .	21.2.11.18	11½	6¾	3½	1¾

canine 4 mm. Its condylobasal length is very nearly the same as in the adult ♂ from Aïr, but the total length is 5 mm. shorter, owing to the weak occipital crest. The adult ♀ skulls from Farniso and Dan Kaba, with a condylobasal length of 75 and 76 mm. respectively, are 6 and 5 mm. shorter in that dimension than the adult ♀ from Aïr, and there is a still greater discrepancy between the total lengths, which in the Aïr skull is 92 mm., whereas in the two from North Nigeria it is 80 and 83 mm. From this it may be seen that the three skulls of *haussa* have the occipital crest much less salient than in those from Aïr.

A flat native skin (23.3.24.4), probably brought down to the coast from Northern Nigeria, was procured by Captain C. Armitage on the Gold Coast. In its coloration it is indistinguishable from the foregoing; but the absence of the skull makes the identification doubtful.

SPECIMENS IN THE COLLECTION

♂	Zinder, 300 miles south of Aïr (type)	Angus Buchanan [C&P]	21.2.11.16
2 ♀	Farniso, near Kano, N. Nigeria, 1,700 ft.	,, ,,	21.2.11.17–18
♀	Dan Kaba, N. Nigeria, 1,520 ft.	Rothschild Bequest	39.1672
Skin	Gold Coast? native collector	Capt. C. Armitage [P]	23.3.24.4

Felis lybica foxi, Pocock

1944. *Felis lybica foxi*, Pocock, Proc. Zool. Soc., 114, p. 71 (Kabwir, 2,700 ft., on the slopes of the Panyam plateau, Bauchi Province, Northern Nigeria).[1]

GEOGRAPHICAL DISTRIBUTION.—Panyam plateau, Bauchi Province, Northern Nigeria.

DIAGNOSIS.—A bush-cat much darker in general hue than *F. l. haussa* and other desert or semi-desert races of *F. lybica*; darker also than *F. l. lowei* and *F. l. ocreata*, and most nearly resembling in this respect the more northern

[1] In three papers (*Ann. Mag. Nat. Hist.*, 1912 and 1913) Thomas reported on several collections, mostly of Rodents, made by G. T. and J. C. Fox in the Bauchi Province, about 10°E. and 10°N., some 300 miles south of the localities of *F. l. haussa*. Most of the specimens were claimed to represent new races or species, but no reference was made to the skin and two skulls of this cat, which was also new.

race of *F. l. sarda*, particularly in the red hue of the face, but the coat is much less luxuriant, the spinal area and crown are less black, there is no blackish tip to the ears, and the pale speckling on the flanks is more buffy, less clear grey.

Colour.—The skin of the type, an undated ♂, has the coat short, the hairs of the flanks being 27 and of the spinal area 46 mm., but the tail in comparison is bushy, its hairs being about 40 mm. The general colour above is ruddy, dark greyish brown, the hairs being very closely speckled buffy grey and black, with the spinal area deep rusty brown, speckled reddish and black; the wool on the flanks is pale buff, on the crest rich ochreous; the backs of the ears are dark earthy red; the face has no white, except on the edge of the upper lip; the muzzle is deep reddish brown, like the ears, and the pale patches on the inner sides of the eyes are buff. The under side of the chin and interramal area are white, but the throat is rich buff in front, turning to ochreous behind; the chest and abdomen are rich ochreous overcast with white, and the genital area and the backs of the thighs down to the hocks are rusty ochreous, and the hind feet are black to the hocks; the upper side of the tail is contrasted with the spinal area by being blacker, with the hairs exclusively white, and there are only two well-defined black stripes in front of the black tip. The pattern, except for the tail stripes and the bracelets, is obsolete almost everywhere, being faint even on the outer side of the legs and represented by reddish spots below.

The flat skin, no doubt stretched, has the head and body 28 in., the tail 15 in.

Skull.—The skull of a ♂, just adult (13.9.9.1), with the same history as the skin, has a condylobasal length of 90 mm., and a zygomatic width of 67 mm., and is considerably bigger than the much older skull of the ♂ type of *F. l. haussa* and as big as the ♂ skull from Tchsiderak, in the Aïr Province of the Sahara, referred to *F. l. lynesi*. It is moderately well moulded, has the temporal ridges 17 mm. apart and the sagittal crest 2½ mm. high, its upper canine is 4½ mm. thick, and its carnassials are respectively 11 and 8 mm., as in the type of *F. l. lynesi*. The skull of a young adult ♂ (13.2.5.3), with the same history, has a condylobasal length of 87 mm., and its other dimensions nearly the same as in the first, but its sagittal crest is only 1 mm. high and its teeth are a little larger, the upper canine being 5 mm. thick and the carnassials 12 and 9 mm. respectively.

I tentatively refer to this race an apparently adult skin made up as a bandolier and procured from a native at Zaria, North Nigeria, by Bruce Smith (23.6.5.1). It differs from the type of *foxi* in the greyer speckling of the ground colour, blacker spinal area, very distinct brownish pattern, and much less ochreous under side. It is, of course, not certain that Zaria was the original home of this specimen.

Specimens in the Collection

♂	Kabwir, Panyam Plateau, 2,700 ft., Bauchi Prov., North Nigeria	J. C. Fox [C & P]	12.11.7.5 type
♂ skulls	Kabwir, Panyam Plateau, 2,700 ft., Bauchi Prov., North Nigeria	,, ,,	13.9.9.1 13.2.5.3
	? Zaria, North Nigeria, native collector	Bruce Smith [P]	23.6.5.1

Felis lybica brockmani, Pocock

1910. *Felis ocreata*, Drake-Brockman, Mamm. Somaliland, p. 20 (Sogsodi, Golis Range, British Somaliland).
1944. *Felis lybica brockmani*, Pocock, Proc. Zool. Soc., vol. 114, p. 72.

Geographical Distribution.—British Somaliland and Ogaden.

Diagnosis.—A bush-cat intergrading with *F. l. ocreata* from the highlands of Abyssinia and with the southern forms described as *F. l. taitae* from Kenya and *F. l. ugandae* from Uganda, but typically distinguished from them by its strongly pronounced pattern on the average and its smaller skull.

Colour.—In typical skins the pattern varies in distinctness individually from palish brown to black, but is represented above by longitudinal stripes on the head, nape, shoulders and usually on the spinal area, by normal vertical stripes on the sides, well-defined stripes on the outer sides of the limbs to the wrist and hock, and up to five or six stripes on the tail; on the under side of the body and inner sides of the legs it is always strong and blackish, there are collars on the throat and the backs of the hind feet are black to the hock.

The skin of the type, a young adult ♂, from Sogsodi, near Upper Sheikh, in the Golis Range, 5,000 ft. (Drake-Brockman, 6.5.4.1), February 26, has the hairs of the winter coat 30 mm. on the flanks, 47 on the crest; the ground colour above is slightly tawny grey, the pale speckling of the hairs being pale buff, the dark speckling fuscous rather than black, and the spinal area is weakly defined, there being comparatively little buff in it; the wool of the flanks is pale buff, of the crest pale ochreous; the ears are rusty brown; the pattern on the upper side is well defined and as described above; on the under side the chin and interramal area are white, the throat is marked in front by two mesially interrupted reddish collars and behind by two complete broader deep brown collars; the rest of the under side is buff, with strong black pattern, and there is an ochreous tinge about the genitalia and on the backs of the thighs.

The skin of an adult ♂ from Gorahai, in the Ogaden district, about 2,500 ft. (H. N. Dunn, 4.5.9.6), February 9, tolerably closely resembles the type, but has the coat a little shorter, 25 and 41 mm., the general colour above rather clearer, less tawny grey, the pattern a little fainter, with less black on the stripes and spinal area, and on the legs and throat not so strong, but on the belly it is equally pronounced; below the general colour is paler, cream, and the hue of the backs of the thighs is less rich.

A young adult ♀ skin from Gerlogubi, in the Ogaden district, about 2,500 ft. (Dunn, 4.5.9.5), January 18, has the coat 28 and 44 mm., and differs from both the preceding by the silvery grey ground colour of the upper side and its more pronounced blacker pattern, which is thrown into stronger relief by the whiter ground colour; the lower side is whiter than in the skin from Gorahai, but the wool and the backs of the thighs are richer ochreous than in either of the two ♂♂.

The rest of the typically coloured and patterned skins agree closely with those described above. One (Drake-Brockman, 34.9.14.9), December, procured

from a native at Bulhar, in the Esa country east of Zeyla, and probably brought from the Gudabursi Hills, has the coat 26 and 40 mm. and resembles the skin from Gorahai, but has the pattern above, especially on the spine, and on the outer sides of the legs not so pronounced and is whiter below. Another (Drake-Brockman, 34.9.14.11), probably from near Odweina, west of Burao, and without collector's number, closely matches the skin from Gerlogubi in its clear grey colour and strong pattern.

Another (34.9.14.10), probably from the same locality, is very like the type, but a little greyer above and below, and has the pattern not quite so strong. It is in a measure intermediate between the type and the skin from Odweina mentioned below. A skin from Burao Fort, 4,200 ft. (G. W. Bury, 8.7.24.10), December 29, also closely matches the type, but has the coat fuller and longer, 42 and 52 mm.

Two skins differ from the above described in the almost complete suppression of the pattern and darker, more iron-grey colour above. An adult ♂ (Drake-Brockman, 9.6.1.12), from Odweina, 3,400 ft., 45 miles west of Burao, March, with the coat 34 and 45 mm., is darkish grey, the speckling of the coat being black and white; there is no appreciable pattern above, and it is weak on the legs and chest and there are no collars on the throat. This skin very closely matches the one assigned to *ocreata* from Tigré, in Northern Abyssinia, but has the coat shorter and less luxuriant, the ears a little darker, and the under side and inner surfaces of the legs white, not so buff. It is also very like a skin from Mokotan, Baringo, representing the Kenya race (*taitae*), but the latter is ochreous and much more richly coloured below. A ♀ skin from Berbera (W. A. Bowring, 2.6.18.1), with the coat 30 and 43 mm., resembles the last from Odweina, but has the stripes on the legs stronger and the wool everywhere dull, without the buff and ochreous hue of the Odweina skin.

Measurements

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
			in.	in.	in.	in.
♂ yg. ad.	Sogsodi, nr. Upper Sheik .	6.5.4.1 (type)	23	14½	—	—
♂ ad.	Gorahai, Ogaden . .	4.5.9.6	21⅛	14⅛	5⅜	2⅛
♂ yg.	Burao Fort . . .	8.7.24.10	17⅜	12⅝	4⅛	2⅜
♀ ad.	Berbera	2.6.18.1	(20)	(13)	—	—
♀ yg. ad.	Gerlogubi, Ogaden . .	4.5.9.5	18	14	5	2⅜

The measurements of the ♀ from Berbera are bracketed because they are estimated from the given dimension of the specimen as 33 inches from nose-tip to tail-tip.

Skull.—Of the adult ♂ skulls, the largest is that of the specimen from Gorahai, with a condylobasal length of 93 mm., and the smallest the one from near

MEASUREMENTS OF THE SKULL AND TEETH IN *FELIS LYBICA BROCKMANI*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	pm^4	m_1
			mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Gorahai, Ogaden .	4.5.9.6	102	93	75	45	33	20	25	20 : 16	69	11	8
♂ ad.	Odweina, west of Burao . .	9.6.1.12	—	(92)	72	45	30	18	24	—	66	11	8
♂ ad.	? near Odweina .	34.9.14.14	—	(92)	69	41	26	18	26	—	65	12	8
♂ ad.	Near Odweina .	34.9.14.13	97	90	71	42	31	18	22	20 : 14	65	10	8
♂ yg. ad.	Sogsodi, near Upper Sheik (type) .	6.5.4.1	94	88	65	45	33	17	24	21 : 15	62	11	9
♀ yg. ad.	Gorahai, Ogaden .	4.5.9.36	87	80	60	43	34	15	21	19 : 14	56	11	8
♀ yg. ad.	Near Odweina .	34.9.14.12	87	82	63	45	35	15	22	20 : 14	57	10	8
♀ yg. ad.	Gerlogubi, Ogaden .	4.5.9.5	83	76	59	42	34	15	21	18 : 15	54	10	7
♀ ad.	Berbera . . .	2.6.18.1	—	(81)	60	43	34	15	21	19 : 16	55	$9\frac{1}{2}$	$7\frac{1}{2}$

Odweina (34.9.14.13), which is 90 mm. Two additional adult ♂ skulls from Odweina have the occiput cut away and their condylobasal lengths are estimated; the skull of the type from Sogsodi is young adult. I make the average condylobasal length of the five skulls about 91 mm. The ♀ skulls have the average condylobasal length about 81 mm. The upper and lower unworn carnassial teeth in the type are 11 and 9 mm. respectively, but these teeth vary from 12 to 8 mm. respectively in the ♂ and are a trifle smaller in the ♀.

Specimens in the Collection

♂	Gorahai, Ogaden	Major H. N. Dunn [C & P]	4.5.9.6
skull	,, ,,	,, ,,	4.5.9.36
	Gerlogubi Well, Ogaden	,, ,,	4.5.9.5
♂	Sogsodi, near Upper Sheik		
♂	Golis Range, 5,000 ft.	Dr. R. E. Drake Brockman [C & P]	6.5.4.1 (type)
♂	Odweina, 45 miles west of Burao	,, ,,	9.6.1.12
Skin	Bulhar, Esa country, east of Zeyla	,, ,,	34.9.14.9 etc.
2 skins	Near Odweina?	,, ,,	34.9.14.10–11
♂ ♀ skulls	,, ,,	,, ,,	34.9.14.12–13
♂ skull	,, ,,	,, ,,	34.9.14.14
	Berbera	W. A. Bowring [C & P]	2.6.18.1
1	Burao, caught alive	Zoological Society [P]	39.672
♂	Burao Fort, 4,200 ft.	G. W. Bury [C & P]	8.7.24.10

Felis lybica rubida, Schwann

1904. *Felis ocreata rubida*, Schwann, Ann. Mag. Nat. Hist., 7th ser., 13, p. 422 (Tingasi, Monbuttu, Belgian Congo); Heller, Smiths. Misc. Coll., 61, 13, p. 14, 1913; Hollister, Bull. U.S. Nat. Mus., 99, pp. 178–9, 1918; J. A. Allen, Bull. Amer. Mus. Nat. Hist., 47, p. 276, pls. 76–8, 1924.

Geographical Distribution.—Belgian Congo.

Diagnosis.—A very imperfectly known darkish coloured bush-cat, distinguished, at least so far as the type is concerned, by the dominantly pale brown or "cinnamon" hue of the upper side, with little, if any, black speckling in the pelage, except on the dorsal middle line, and by the peculiarity of its pattern, which is not only unusually distinct for a sub-adult specimen, but consists on the flanks of spots showing no tendency to form vertical stripes.[1]

Colour.—The type, a youngish ♂ (87.12.1.6), October, with the coat short, 22 mm. on the flank and 34 mm. on the crest, is exceptional for the dark greyish brown hue of the upper side, the bright orange ochreous hue of the chest, belly and inside of the legs, and the distinctness of the pattern below and above, that of the sides of the body consisting of conspicuous dark brown spots not forming definite stripes anywhere, but the head, nape and shoulders are marked

[1] This type of pattern is unknown in the other African races of *F. l. lybica* and may be an aberrant individual feature. It is reminiscent of the pattern of the Asiatic races, *F. l. ornata* and *F. l. caudata* (see pp. 118 and 124).

with fainter brown spots; the spinal area is brown, a blend of black and ochreous speckling, and the wool is rich orange ochreous. A younger specimen from Gadda, Monbuttu (87.12.1.7) is greyer than the type, not nearly so deeply and richly coloured above and below, with the wool much paler, the pattern much fainter and consisting of numerous normally vertical pale brownish stripes giving a brindled effect. This specimen rather closely resembles in the tint of the upper side the topotype of *F. l. ugandae* described below. A third skin from Monbuttu (87.12.1.8), a half-grown specimen, is much brighter and yellower, or buffier, than the preceding, has the striped pattern much stronger and the black of the hind foot restricted to the area of the pads, both this and the distinctness of the pattern being, no doubt, juvenile characters. Another young specimen (19.5.8.23) from this area of the Belgian Congo, namely from Poko, on the Welle River, differs from those from Monbuttu in being greyer on the sides, blacker on the spinal area, and in being more obscurely striped. It is an almost exact match of the ♀ topotype of *F. l. ugandae*, except that the wool of the upper side and of the ventral surface is not so richly tinted. With the specimen from Gadda it attests complete intergradation between skins from the Belgian Congo and Uganda.

According to J. A. Allen, thirteen adult skins from Faradje exhibit two extreme but intergrading colour phases, one distinctly grey, the other rufescent. In the grey phase a brown spinal band runs from the head to the root of the tail and the lateral pattern consists of deep brown transverse stripes composed of more or less confluent spots, the lower side being cream or pale fulvous, with dark spots. In the rufescent phase there is merely a slight grey cast from the pale hair-tips and the median dorsal band and the lateral stripes are pale reddish cinnamon. His photograph of a freshly killed specimen shows a distinct but rather faint pattern of lateral stripes and no black extending to the hock on the hind foot, two features in which it differs markedly from the type and photographs of five native skins show the typical "*torquata*"-pattern of conspicuous black stripes. It must be remembered that red is reproduced as black by photography. Nevertheless, these photographs might have been taken from English house-cats with typical *torquata*-pattern. Allen stated, moreover, that four of his series of skins were partially albinistic.

This suggests that they may have been pure-bred feral house-cats or half-bred specimens. And this suggestion may supply the explanation of the anomaly he pointed out in the females being larger than the males.

All the skins assigned to this race in the British Museum are young and none was measured in the flesh. The flesh measurements in English inches recorded by Allen of the Faradje specimens are given on p. 87.

Skull.—The only skull in the British Museum old enough to be worth recording is that of the type, a young and imperfect specimen. I estimate its condylobasal length to have been only about 80 mm. Allen gave some measurements of four ♀ and two ♂ skulls he referred to this race. His adult ♀ skulls range in condylobasal length from 85·4 to 79·2 mm., the average in four specimens being 82½ mm., a little shorter than in the Kenya Colony race, *F. l. taitae*, described below (p. 92), and pm^1 in the same skulls varies from 11·8 to 10·3 mm.

SKULL MEASUREMENTS OF THE TYPE OF *FELIS LYBICA RUBIDA* AND OF SPECIMENS REFERRED TO THAT RACE BY J. A. ALLEN

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Balla*	*Mand. length*	*pm*^{1}	*m*$_1$
			mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ yg. ad.	Monbuttu, Belgian Congo (type) .	87.12.1.6	—	(83·0)	61·0	43·0	30·0	14·0	22·0	20 : 14	58	11·0	9
♀ ad.	Faradje, Belg. Congo	(*vide* Allen)	90·4	85·4	62·5	44·0	29·7	16·6	—	—	—	11·8	—
♀ ad.	,, ,, ,,	(*vide* Allen)	91·0	84·0	61·7	42·0	30·6	16·5	—	—	—	11·3	—
♀ ad.	,, ,, ,,	(*vide* Allen)	84·6	81·0	59·4	40·5	31·7	15·5	—	—	—	11·0	—
♀ ad.	,, ,, ,,	(*vide* Allen)	86·4	79·2	60·2	44·0	35·5	15·0	—	—	—	10·3	—
♂ ad.	,, ,, ,,	(*vide* Allen)	82·7	78·0	56·5	41·6	32·8	14·4	—	—	—	10·7	—
♂ yg.	,, ,, ,,	(*vide* Allen)	83·0	77·5	50·0	43·3	31·5	14·8	—	—	—	11·0	—

MEASUREMENTS

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
			in.	in.	in.	in.
♂ yg.	Faradje, Belgian Congo . .	(*f*)	17 3/5	11 4/5	5 −	2 1/2
♂ ad.	,, ,, ,, . .	(*e*)	16 2/5	11 4/5	5	2 1/2
♀ ad.	,, ,, ,, . .	(*b*)	21	12	5 +	2 2/5
♀ ad.	,, ,, ,, . .	(*d*)	19 3/5	12 3/5	5 +	2 +
♀ ad.	,, ,, ,, . .	(*c*)	19	12	5 +	2 1/2

Of his ♂ skulls, one, indicated as adult, has the condylobasal length only 78 mm. and pm^4 10·7, the other marked "young" has those two dimensions 77·5 and 11 mm. The adult skull is slightly shorter than the smallest ♀ skull, and it is noticeably narrower across the zygomata and wider across the postorbital area instead of conversely, which should be the case if both belong to the same race of wild cat. The young ♂ skull may be that of a pure-bred *rubida*; but there is obvious evidence that the adult ♂ skull may be that of a feral house-cat. Allen's material clearly needs revision.

SPECIMENS IN THE COLLECTION

♂	Tingasi District, Monbuttu, Belgian Congo	Dr. Emin Pasha [C & P]	87.12.1.6 (type)
1	Gadda, Monbuttu District	,, ,,	87.12.1.7
1 yg.	Monbuttu District	,, ,,	87.12.1.8
1 yg.	Poko, Welle River, Belgian Congo	Dr. Cuthbert Christy ,,	19.5.8.23

Felis lybica ugandae, Schwann

1904. *Felis ocreata ugandae*, Schwann, Ann. Mag. Nat. Hist., 7th ser., 13, p. 424 (Mulema, Uganda, 1° S. 31° E., 5,000 ft.); Heller, Smiths. Misc. Coll., 61, No. 13, p. 14, 1913; Hollister, Bull. U.S. Nat. Mus., 99, pp. 178–9, 1918; J. A. Allen, Bull. Amer. Mus. Nat. Hist., 47, p. 277, 1924.

1913. *Felis ocreata nandae*, Heller, Smiths. Misc. Coll., 61, No. 13, p. 14 (source of Lukosa River, Nandi Escarpment, Kenya Colony); G. M. Allen and B. Lawrence, Bull. Mus. Comp. Zool., 79, No. 3, p. 66, 1936.

1944. *Felis lybica ugandae*, Pocock, Proc. Zool. Soc., 114, pp. 299 and 301.

GEOGRAPHICAL DISTRIBUTION.—Mongalla, in the South Sudan, Garamba, in the Belgian Congo, Uganda, Kenya Colony, ? Tanganyika Territory.

DIAGNOSIS.—Intergrading with *F. l. rubida*, but on the scanty available evidence regarding the latter, differing from it at least on the average in having more black speckling in the pelage, in being generally duller in the hue of the upper side, and the pattern, when visible, being always normal. Dark grey examples are adaptively like some skins of *F. l. sarda*, but the latter has a

smaller skull, the average condylobasal length in ♂♂ being about 88 mm., as compared with about 94 mm. in *F. l. ugandae*, in which the skull is as big as in *F. l. ocreata* of North Abyssinia, and a little bigger than in *F. l. brockmani* from Somaliland.

Colour.—Adult ♂ and ♀ skins, the type and a topotype respectively from Mulema, 5,000 ft. (3.11.7.8-9), differ considerably in colour. The type, killed in May, is very dark grey, closely speckled black and white with the spinal area dominantly black with comparatively inconspicuous dull, pale ochreous speckling; the wool of the flanks is rich buff, of the crest mostly deep black, but becoming buffish on the loins; the head is dark above, with obscure black stripes, a lot of reddish and ochreous on the face, the upper genal stripe deep brown, the lower reddish and broken up in front and the ears are deep reddish brown. The pattern on the flanks consists of faint, fuscous stripes. On the lower side the chin, interramal, and fore throat are white, the rest being palish buff overcast with white, with two red collars on the hind throat and black and brown spots on the chest. The legs in front are grey, with buffy paws, the stripes are strong and black and the hind foot is black to the hock.

The ♀ topotype, killed in March, is decidedly tawny or buffy grey above, the spinal area is not nearly so black as in the ♂, and has more extensive ochreous bands; the wool of the flanks is brighter, of the crest only blackish for a short distance on the fore back, the rest being rich ochreous. The pattern on the sides consists of faint brown stripes. The lower side is richer tinted, less overcast with white, and the spots are paler. The legs are decidedly buff, especially the inner side of the hind legs, and their external stripes are not nearly so pronounced. Considering the dates of these two skins, the differences between them may be seasonal.

Two skins (34.8.10.11–12) from Mabungo, South-west Uganda, 7,000 ft., also differ individually. The ♂ is very like the type from Mulema, but is darker grey, the dark and pale speckling of the contour hairs being respectively blacker and whiter; the wool on the flanks, however, is slightly paler buff and on the crest paler, dark ochreous brown in front, richer ochreous on the loins; the head is very black, with the ears deep, dull brown, the area round the eyes whiter, the cheeks dark grey, the summit of the nose red, and the cheek-stripes blackish but obscure, not reddish, as in the type; the pattern on the flanks is black, but obscure, on the legs and tail strong; the lower side is rich ochreous on the chest, belly and on the inside and backs of the thighs, with the spots black, as in the type. The ♀ is not so silvery grey as the ♂, and further differs in having a strong pattern of deep brown stripes and spots on the flanks, nearly as pronounced as in the type of *F. l. rubida*, but deeper tinted; the ears are brighter and more rusty than in the ♂, and the hue round the eyes and on the cheeks is brighter; the lower side and the limbs are to a great extent albino, but the fronts of the limbs are much richer ochreous than in the ♂. The partial albinism of this skin suggests the possibility of its being of impure breed.

Heller compared his type of *nandae*, from the source of the Lukosa River on the Nandi Escarpment, Kenya, 7,000 ft., with the type and topotype of *ugandae* from Mulema, and separated it racially on account of its generally

darker colour, laying special stress upon the blackish hue of the ears. Additional specimens from Kakamega, at the base of the escarpment, although a little paler than the type, were also described as darker than the examples from Mulema. Hollister, however, who had Heller's specimens in his hands, declared them to be very much like the specimens of *ugandae*, judging from Schwann's description of the latter; and J. A. Allen considered the two named forms to be probably identical. This opinion, which I adopt, is strengthened by the two above-described examples from Mabungo which are darker than Schwann's examples of *ugandae* and apparently differ from them in nearly the same way as the type of *nandae*; and, it may be noted, they come from exactly the same altitude, namely 7,000 ft., as the type of *nandae*. G. M. Allen, moreover, stated that in a series of skins from Kaimosi, near the Lukosa River, which he referred to as topotypes of *nandae*, the backs of the ears vary from nearly red to nearly blackish. His description of the general colour as buffy grey, with faint indications of the stripes, suggests that his series resembles the topotype of *ugandae* rather than the type. The distinctness of the lateral pattern in Heller's type of *nandae* is perhaps due to its being not quite full grown, as shown by the skull, although he described it as adult.

A young adult ♂ skin (30.12.2.22) from Serere, Teso district, in the Eastern Province of Uganda, January–February, closely resembles the ♀ topotype of *ugandae* in superficial colouring, but has the body pattern stronger, more pronounced than in any of the skins assigned to this race, except the ♀ from Mabungo in South-western Uganda. An adult ♂ skin (30.8.1.32) from Kamdini, Gulu, Uganda, 3,000 ft., is an aberrant erythristic mutant, being red almost all over, with the spinal area deeper than the flanks, the under side, the cheeks, chin and inner side of the thighs buffy whitish, the pattern on the body a little deeper red than the ground colour and the red stripes on the tail set off by whitish interspaces. If the skin alone had been preserved it might reasonably have been dismissed as that of a feral domestic cat; but the large size of the skull, with its bullae and teeth, does not support that conclusion. A half-grown kitten (4.2.6.6) from Burumba, Ankole, Uganda, 5,000 ft., is younger than the kitten of *F. l. rubida* from Monbuttu, and has a decidedly darker ochreous ground colour, and the pattern blacker and stronger, being represented by longitudinal stripes on the head, cheeks and spinal area, but broken on the nape, and with the normal transverse stripes on the sides and legs.

The skin of an adult ♂ (25.1.6.18) from Juba, Mongalla, in the Southern Sudan, June 4, attests the extension of this race considerably to the north of Uganda. In general ground colour it closely resembles the topotype of *ugandae*, but is a shade paler and has the pattern a little more distinct probably owing to the coat being shorter. It also closely resembles a skin from Machakos, in Kenya Colony, referred to under the next race, *F. l. taitae*, but has the pattern better defined, the wool a little duller, and the under side not quite so buffy, differences of no systematic importance. From Garamba, north of Faradje in the Belgian Congo, a locality like Mongalla in its physical features, J. A. Allen recorded a skin which he referred to *ugandae*, because it was darker and larger than the specimens from Faradje, which he identified as *F. l. rubida*.

MEASUREMENTS

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
			in.	in.	in.	in.
♂ ad.	Juba, South Sudan	25.1.6.18	22 1/8	14 3/8	5 3/8	2 1/4
♂ ad.	Garamba, Belg. Congo	(*vide* J. A. Allen)	22 1/4	13 1/2	5 1/4	
♀ yg. ad.	Mulema, Uganda, type of *ugandae*	3.11.7.8	23 5/8	13 5/8	5 1/2	2 3/8
♀ yg. ad.	Nandi, Kenya, type of *nandae*	(*vide* Heller)	21 1/8	16 3/4	5 1/8	—
♂ ad.	Kakamega, Kenya	(*vide* Hollister)	20 3/8	13 3/8	5 3/8	—
ad.	Kaimosi, Kenya	(*vide* G. M. Allen)	22 1/2	14	5 1/4	2 1/4
ad.	Mulema, Uganda	3.11.7.9	22 1/4	—	5	2 3/8
ad.	Kakamega, Kenya	(*vide* Hollister)	19	15 1/4	4 3/4	—
yg.	Burumba, Uganda	4.2.6.6	10 3/8	5 1/4	2 1/4	1 1/8

These measurements suggest that there is practically no difference between the males and females in bodily size, but this is not borne out by the skulls. The dimensions of the specimen from Burumba attest the relative shortness of the tail in a half-grown kitten.

SKULL.—The skull of the type is fully adult and well moulded, with the temporal ridges only 4 mm. apart, the occipital crest salient and the sagittal crest 5 mm. high; the nasals are long and constricted, 24 mm. long in the middle line, but only 4 mm. wide between the frontal points; the facial profile from the crown to the anterior end of the nasals is evenly and lightly convex and the frontals between the orbits are flattish owing to the absence of air-cell inflation. The skull from Kamdini, Gulu, belonging to the red skin, is exceptionally large and is older and more moulded than the type, although the temporal ridges at the suture are the same distance apart; it also differs noticeably in its shorter, broader nasals, which have a median length of 20 mm. and a width of 6 mm. between the frontal points, and it is higher owing to the considerable inflation of the frontals between and behind the orbits. The skull from Mongalla, although adult, is younger than that of the type, the temporal ridges being 11 mm. apart and the occipital and sagittal crests less developed; in its nasals and frontal inflation it closely resembles the Kamdini skull. The skull of the type of *nandae* was described by Heller as adult; but Hollister's photograph shows it to be a young-adult, with widely separated temporal ridges, wide postorbital area, and open basioccipital suture. Its dimensions agree very closely with those of the skull from Serere, Teso district, which is also young-adult, and when fully developed both would probably have been intermediate in size between the type and the skull from Kamdini. The young-adult ♂ skull from Mabungo has the frontals inflated as in the skull from Kamdini.

The young-adult ♀ skull, the topotype from Mulema, with the temporal ridges 22 mm. apart, has the frontals flat and uninflated, as in the type, but

SKULL MEASUREMENTS OF *FELIS LYBICA UGANDAE*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	pm^4	m_1
			mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Juba, Sudan . .	25.1.6.18	102	93	72	44	30	18	26	20 : 15	66	11	8
♂ ad.	Garamba, Congo .	(*vide* J. A. Allen)	102	93	67·3	44	29·7	16·6	—	—	—	11·8	—
♂ ad.	Kamdini, Uganda .	30.8.1.32	109	100	74	44	30	19	25	22 : 15	73	11	9
♂ ad.	Mulema, Uganda . (type of *ugandae*)	3.11.7.8	102	93	71	45	30	16	24	21 : 14	67	11	9
♂ yg. ad.	Mabungo, Uganda .	34.8.10.11	—	(88)	65	43	31	16	23	—	63	11	8
♂ yg. ad.	Serere, Uganda .	30.12.2.22	—	94	70	—	35	20	27	19 : 16	67	12	9
♂ yg. ad.	Nandi, Kenya . (type of *nandae*)	(*vide* Heller & Hollister)	101	94	69	47	35	20	—	—	67	10·5	8
♂ ad.	Kakamega, Nandi .	(*vide* Hollister)	—	91	71	—	—	—	—	—	64	11	8·9
♀ yg. ad.	Mulema, Uganda .	3.11.7.9	91	84	62	44	35	15	22	20 : 15	58	10·5	8
♀ ad.	Mabungo, Uganda .	34.8.10.12	—	(88)	67	44	33	17	24	—	63	11	7·5
♀	Kakamega, Nandi .	(*vide* Hollister)	—	82	62	—	—	—	—	—	58	11	8

differs from it noticeably in having short, broad nasals, as in the Kamdini skull, and the anterior half of the nasals rather abruptly sloped. The adult ♀ skull from Mabungo, with the temporal ridges 15 mm. apart, resembles the last in the flatness of the forehead, thus differing from the ♂ from the same locality, but the upper ends of the olfactory chambers are more inflated than in the topotype, so that the nasals are more abruptly sloped.

In the table of measurements the condylobasal length in the two imperfect skulls from Mabungo has been estimated from the length of the mandible.

Specimens in the Collection

	Juba, Mongalla, Sudan	Rev. Archdeacon A. Shaw [C & P]	25.1.6.18
	Mulema, Uganda, 5,000 ft. (W. G. Doggett)	Col. Delmé Radcliffe [P]	3.11.7.8 (type) and .9
Juv.	Burumba, Ankole, Uganda	,, ,,	4.2.6.6
♂	Kamdini, Gulu, Uganda	Capt. C. R. S. Pitman [C & P]	30.8.1.32
♂	Serere, Teso Dist., East Uganda	G. W. Foster [C & P]	30.12.2.22
♀	Mabungo, South-west Uganda, 7,000 ft.	R. Akroyd [C & P]	34.8.10.11–12

Felis lybica taitae, Heller

1913. *Felis ocreata taitae*, Heller, Smiths. Misc. Coll., 61, No. 13, p. 14 (Voi, South-eastern Kenya Colony, 1,830 ft.); Hollister, Bull. U.S. Nat. Mus., 99, p. 178, pls. 50–1, 1918.

Geographical Distribution.—Kenya Colony and Tanganyika Territory.

Diagnosis.—Completely intergrading with *F. l. agandae*, but on the average paler and greyer. Also intergrading with *F. l. brockmani*, but on the average not so strongly striped and with a larger skull.

Colour.—This race was described by Heller as a "desert cat". He had two specimens agreeing with each other in "body coloration minutely", the type from Voi and the other from the northern Guaso-Nyiro River, near its junction with the Isiola, some 300 miles to the north of Voi. Hollister recorded it from the Ulukenia Hills on the Athi Plains, east of Nairobi; and stated in effect that certain specimens he assigned to this race are only slightly paler than an example identified as *nandae* from Kakamega.

Heller diagnosed this race as light-coloured, with fulvous ears, and closely resembling typical *F. ocreata* as represented by two Abyssinian specimens in the British Museum, but distinguished from them by having the under side darker buff and distinctly spotted. Since the two specimens alluded to, as stated above (p. 70), differ in the colour of the upper side and the ventral spots are traceable in both, the diagnosis is somewhat vague. I have assumed that the type of *taitae* resembled in dorsal coloration the clear grey skin of *F. l. ocreata* from Tigré.

The specimens above referred to seem to have had no perceptible pattern

above, although spotted below. A skin of an adult ♀ (9.5.13.4) in the British Museum evidently closely resembling them in these respects, as it does also in the clear grey hue of the upper side, was shot in "open bush country" at Mokotan, Baringo, 3,200 ft., January. It is slightly the palest of the tropical East African skins in the British Museum, and has the pattern weak on the legs, with the lower side from the fore throat to the inguinal region and inner side of the thighs ochreous, with black spots on the chest. In the colour of the upper side it is hardly distinguishable from the grey, patternless skin of *F. l. brockmani* (9.6.1.12) from Odweina, in Somaliland, described above (p. 82), but the latter is much more extensively whitish between the eyes, has paler cheeks and legs, and practically the whole of the under side white. An immature ♂ skin (3.11.1.1) from Fort Hall, 4,000 ft., June, resembles the one from Mokotan in the absence of pattern above, but is slightly less grey above and mainly white below. An adult ♀ skin (35.2.12.1) from the Eldama Ravine, 5,800 ft., March, is like the Mokotan skin in its clear grey ground colour above, and was also shot in bush country, but differs in having a rather faint brindled pattern above.

A young adult ♂ (24.1.1.74) from Kilosa, Usagara district, Tanganyika Territory, May, is also clear grey in ground colour, but is rather darker than the skin from Mokotan owing to there being more black and less whitish speckling in the pelage; it also has a distinct though faint pattern on the sides, but not so distinct as in the skin from the Eldama Ravine, and its leg stripes are stronger than in the Mokotan skin, although it resembles the latter in its rather pale ears and in the richness of its hue, with black spots, below. This skin decidedly approaches the type of *F. l. ugandae*, but is rather paler grey on the flanks, much less black on the spinal area, and has paler ears. A younger skin (24.1.1.75) from Mtalis, Mkalama district, Tanganyika Territory, October, is very similar to the one from the Eldama Ravine.

In the above-described grey skins tentatively assigned to *F. l. taitae*, there is practically an unbroken gradation between the palest from Mokotan, through the darker from Kilosa to the type of *F. l. ugandae*, and thence to the darkest of all, the type of *nandae* and the ♂ from Mabungo.

Other skins similarly intergrade with the tawnier ♀ topotype of *ugandae* and are hardly distinguishable from it. One from Machakos (92.12.3.2) is slightly more tawny in general tint than the clearer grey series and is intermediate between them and the ♀ topotype of *ugandae*, and the skin from Mongalla, differing from them only in unimportant details. A ♀ from Baringo (30.1.2.15) differs only from the topotype of *ugandae* in having the hairs of the crest less black and coppery, the pattern more fuscous, not so brown, the limbs greyer, the ears a shade darker and the under side a little paler. A skin from Njemps, Baringo, 3,200 ft. (44.30), is moulting, and with faded fur is a little paler than the last and superficially resembles the Machakos skin. A skin (63.7.7.16) from Meninga, about 70 miles north of Tabora, Tanganyika Territory, is tawnier than the two from Mtalis and Kilosa, closely matching the topotype of *ugandae*, although a shade paler above, with less black on the crest, and the pattern a little more distinct. It is also unmistakably like the skin referred to *ugandae*

from Mongalla and, like some of the skins from Kenya Colony, might with equal propriety have been referred to that race, so impossible is it to draw the line between the two.

MEASUREMENTS

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
			in.	in.	in.	in.
♂ yg. ad.	Kilosa, Tanganyika Territory	24.1.1.74	22	13	$4\frac{4}{5}$	$2\frac{2}{5}$
♀ ad.	Isiola River, Kenya .	(*vide* Hollister)	20	$13\frac{3}{5}$	5	—
♀ ad.	Voi, Kenya (type) . .	(*vide* Heller)	$19\frac{4}{5}$	$12\frac{2}{5}$	$4\frac{4}{5}$	$2\frac{1}{5}$

These measurements agree tolerably closely with those of *F. l. ugandae*.

SKULL.—The skulls do not appear to differ in size from those of *F. l. ugandae*, with which *F. l. taitae* intergrades to the west, but they are a little bigger than those of *F. l. brockmani*, with which it intergrades to the north. In ♀ skulls of *taitae* the average condylobasal length is about 85 mm., whereas in the Somaliland race it is probably not over 81 mm. as far as can be estimated.

The first skull, from Solai, Mount Kenya, entered on the table, consisting only of the jaws, is marked ♀, but from its size and the length of the teeth I do not doubt that it is a ♂. Judging from the length of the mandible, it was nearly as large as the ♂ skull assigned to *F. l. ugandae* from Kamdini. The young adult ♂ skull from Kilosa, Tanganyika Territory (24.1.1.74), has the frontals more strongly inflated with air-cells than the skull from Kamdini; but although its condylobasal length is 10 mm. less than in that skull, its nasals are a little longer, 22 mm., with the width at the frontal points 5 mm.; the profile from the summit to the end of the nasals forms a strong, evenly convex curvature. The fully adult skull from Kenya Colony (6.7.8.31) is unsexed; but I judge it to be ♀ by the width of the postorbital area, which exceeds that of the younger ♂ skulls of *F. l. ugandae*. It is a much larger skull than that of the type of *taitae*, but only slightly if at all larger than the skull from the Eldama Ravine (35.2.12.1), which is marked ♀, and than the ♀ skull of *F. l. ugandae* from Mabungo, in both of which the condylobasal length has been estimated by the mandible. Its temporal ridges are 12 mm. apart at the suture and the frontals are inflated to a moderate extent, not so flat as in the ♀ skull from Mulema. The ♀ skull from Machakos is younger, with the ridges 26 mm. apart, the forehead flat and the nasals rather abruptly bent. The skull from Mokotan, with the ridges 18 mm. apart and the frontals not so flat, as in the Machakos skull, is remarkable for the strong inflation of the upper part of the olfactory chambers, giving a very abrupt slope to the distal half of the nasals.

The differences enumerated are purely individual and there appears to be no difference between the skulls from Kenya Colony and Uganda.

SKULL MEASUREMENTS OF SPECIMENS REFERRED TO *FELIS LYBICA TAITAE*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	pm^4	m_1
			mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
[♂ ad.]	Solai, Mt. Kenya .	11.4.7.15	—	(97)	—	—	—	—	26	—	71	12	10
♂yg. ad.	Kilosa, Tanganyika .	24.1.1.74	95	88	64	44	32	19	23	21 : 17	64	12	8
♀ ad.	Kenya Colony .	6.7.8.31	98	90	70	45	34	19	25	22 : 18	—	11	—
♀ ad.	Eldama Ravine, Kenya	35.2.12.1	—	(90)	70	43	33	18	22	—	65	11	9
♀ ad.	Machakos, Kenya .	92.12.3.2	94	86	68	48	40	19	23	20 : 16	62	10	8
♀ ad.	Mokotan, Kenya .	9.5.13.4	93	85	66	43	35	19	22	20 : 16	62	10	8
♀ ad.	Guaso-Nyiro . .	(*vide* (Hollister)	—	82	59	—	—	—	—	—	57	10·7	8
♀ ad.	Voi, Kenya (type) .	(*vide* Heller)	87	80	63	43	33	—	—	—	59	10·6	8·6

SPECIMENS IN THE COLLECTION

1	Kenya Colony	Lord Delamere [C & P]	0.10.6.4
[ ] Skull	,, ,,	Mrs. Holms-Tarn [P]	6.7.8.31
	Machakos, Kenya	Sir F. J. Jackson [C & P]	92.12.3.2
♂	Fort Hall, ,,	Dr. S. L. Hinde [C & P]	3.11.1.1
[ ]	Solai, Mount Kenya (R. Kemp)	C. D. Rudd [P]	11.4.7.15
	Eldama Ravine, Kenya	S. O. Crowther [C & P]	35.2.12.1
	Baringo, Kenya	Sir F. J. Jackson [C & P]	30.1.2.15
1	Njemps, Lake Baringo	Hon. K. R. Dundas [C & P]	44.30
	Mokotan, Baringo	,, ,,	9.5.13.4
1	Meninga, Tanganyika	Capt. J. H. Speke [C & P]	63.7.7.16
♂	Kilosa, Usagara, Tanganyika	A. Loveridge [C]	24.1.1.74
1	Mtalis, Mkalama, ,,	,,	24.1.1.75

NOTE.—The types of the three races above considered are quite distinct in coloration. The type of *rubida* from Monbuttu, in the Belgian Congo, is distinguished by the greyish brown tint of the upper side, relieved by a bold pattern of deep brown spots, not stripes, and by the very bright hue of the under side. The type of *ugandae* from Mulema, in North-west Uganda, differs by the dark iron-grey hue of the upper side due to the blend of the black and whitish speckling of the contour hairs, the pattern of the flanks being faint and consisting mostly of normal stripes and the lower side pale buff overcast with white. The type of *nandae* from the Nandi Escarpment, Kenya Colony, is even darker than the last, but closely resembles a skin from Mabungo, South-west Uganda. The type of *taitae* from Voi, south-eastern Kenya Colony, was described as a desert cat and as much paler than the types of *ugandae* and *nandae*. But a topotype of *ugandae* is also a good deal paler than the type, being tawny or buffy grey above, and there is a complete intergradation between this skin and the palest skins from the Kenya Colony plains. Similarly, this topotype of *ugandae* differs only in minor particulars from a young skin of *rubida* from the type locality Monbuttu and from another from Poko, on the Welle River, both of which are much paler and greyer than the type, have the pattern consisting of normal stripes, and are less richly tinted below.

Felis lybica mellandi, Schwann

1904. *Felis ocreata mellandi*, Schwann, Ann. Mag. Nat. Hist., 7th ser., 13, p. 423; Thomas, Ann. Mag. Nat. Hist., 9th ser., 17, p. 180, 1926. (Mpika, north-eastern Rhodesia).

1944. *Felis lybica mellandi*, Pocock, Proc. Zool. Soc., 114, p. 300.

GEOGRAPHICAL DISTRIBUTION.—Nyasaland; Northern Rhodesia; Southern Belgian Congo.

DIAGNOSIS.—Closely resembling the type of *F. l. ugandae* in the darkish "iron-grey" hue of the upper side, but differing from that race by its more uniform colouring above, the "tawny-grey" phase being undeveloped, by the brighter hue of the ears on the average, by the complete or almost complete

suppression of the pattern on the flanks, and the weaker stripes on the limbs and the end of the tail. Judging also from a single specimen the skull of the adult ♂ is relatively wider in nearly all its dimensions, the cranial and postorbital areas being less constricted by muscular moulding so that the skull resembles a large ♀ skull.

Colour.—The colour of the upper side exhibits comparatively little individual variation, being dark grey due to the blending of the fine black and whitish-buff speckling of the contour hairs; the head is darker than the flanks, with the ears strongly contrasted by their rusty ochreous or rusty brown hue; the spinal area is generally not sharply differentiated, with its wool mostly, but not always, sooty over the fore back, that of the flanks being bright or paler buff; the under side is whitish, pale buff or richly tinted in the latter case, but varying in the extent to which the underlying bright, sometimes ochreous, buff is diluted and over-sprinkled by the white ends of the hairs; the pattern is comparatively little in evidence, usually not or barely detectable on the sides of the body and typically weak on the outer sides of the legs, and even on the end of the tail the stripes are generally not well pronounced, although the black tip is always retained; the spots on the chest when visible are reddish or fuscous.

There is a considerable number of skins in the collection from the localities entered on the list, but very few were measured in the flesh, most of them being flat skins, without skulls, procured from natives. One of these from Broken Hill (C. R. S. Pitman, 33.3.6.17) has the faint brindling representing the lateral pattern more pronounced than in the others, and the belly is pale buff. Contrasted with this is a skin from Balovale (T. Vaughan Jones, 37.1.4.42), which has the under side exceptionally rich orange ochreous, no pattern above and the markings on the tail represented by little more than the black terminal tip. A skin from the district between the Kafue and the Zambesi Rivers (D. Gordon Lancaster, 35.9.1.151) is exceptional in having the wool of the spinal area only a little duller on the fore back than elsewhere, instead of sooty brown, as is usual. An adult ♂ (35.9.1.154) from Choma, Northern Rhodesia, nearly resembles the skin from Broken Hill in retaining a faint brown pattern, but is soiled white below and has unusually bright, rusty ochreous ears.

The type from Mpika (F. H. Melland, 4.3.11.2) is in poor condition and undated. It has a full coat, the flank hairs being 35 and the crest hairs 48 mm. long. A topotype (F. H. Melland, 7.9.11.1), killed at 4,750 ft. in August, has the coat of the same length and thickness. Both have a red collar on the hind throat and nearly obsolete reddish chest spots. In the topotype the wool of the flanks is rich buff, in the type it is much paler. A more noticeable difference is the presence on the posterior side of the fore leg in the type of a lot of black, which is absent in the other.

Two adult skins from Luluabourg, Kasai, in the Belgian Congo (Callewaert, 27.12.21.22 and 23), collected in May, have the coat much shorter than in the Mpika skins, the flank hairs being 28 and the crest hairs 35 mm. The difference is probably seasonal. They are both more richly coloured below than the Mpika skins and have the chest spots and the collar fuscous. The ♀ (27.12.21.23)

has the wool of the upper side and the lower surface brighter than in the ♂, but the leg stripes are not so strong. The hind foot is black to the hock behind, as in the topotype from Mpika; but in a specimen shot by S. A. Neave in the Loangwa Valley or Broken Hill, Rhodesia, which is paler below than in the two from Mpika, the hind foot is black in its lower half only.

Two young skins from Nyasaland are doubtfully referred to this race. One, from Zomba (A. Sharpe, 95.7.22.1), has the pattern above more distinct than in the Rhodesian series, and the ears are darker. Another, from the Upper Shire (A. Whyte, 94.6.7.5), resembles the last in the distinctness of the pattern and dark ears, but differs in being whitish instead of buff below. The distinctive features of these skins may be due to their immaturity.

A kitten (26.7.6.156), less than half-grown, from Luluabourg, resembles in colour and pattern the one from Ankole, in Uganda, described above (p. 89).

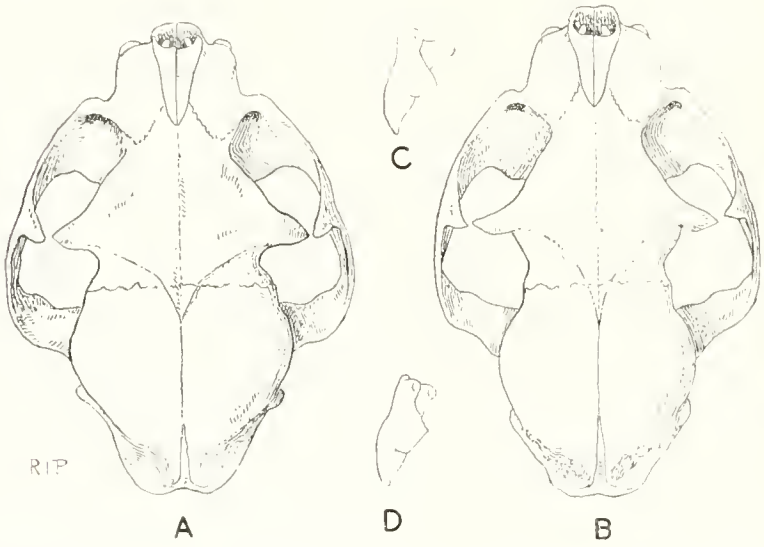

Fig. 4.

A.—Skull of adult ♂ of *Felis lybica mellandi* from Choma, N. Rhodesia, showing the "broad-waisted" type characteristic of adult males of the three South African races *F. lybica cafra*, *F. lybica griselda*, and *F. lybica mellandi*.

B.—Skull of adult ♂ of *Felis lybica ugandae* from Kamdini, Uganda, showing the "narrow-waisted", muscularly moulded type characteristic of that race and of most of the more northern races of the species.

C & D.—The right upper carnassial tooth (pm^4) of two adult ♂ skulls of *Felis lybica griselda* from Kovares, South Kaokoveld, showing the individual variation in the size of the inner lobe (protocone).

SKULL MEASUREMENTS OF *FELIS LYBICA MELLANDI*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	pm^3	m_1
♂ ad.	Choma, N. Rhodesia	35.9.1.154	106	97	78	49	35	21	26	22 : 16	69	11 : $5\frac{1}{2}$	9
♂ yg. ad.	Sesheke District, N. Rhodesia	35.9.1.159	100	93	71	49	39	—	26	22 : 15	65	11 : 4	8
♀ yg. ad.	Kashitu, North-west Rhodesia . .	16.2.26.3	95	87	67	48	37	16	23	22 : 17	61	11	9
♀ ad.	Mpika, North-east Rhodesia . .	7.9.11.1	93	88	65	46	36	17	23	22 : 17	61	11	8
♀ ad.	Luluabourg, Belgian Congo . .	26.11.1.61	91	—	63	45	35	16	23	22 : 16	59	11	9
♀ ad.	Luluabourg, Belgian Congo . .	27.12.21.23	90	83	64	44	34	16	22	20 : 14	60	10	8

MEASUREMENTS

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
			in.	in.	in.	in.
♂ ad.	Luluabourg . . .	27.12.21.22	21 $\frac{1}{5}$	13	5	2 $\frac{2}{5}$
♀ ad.	,, . . .	27.12.21.23	19	11	5 $\frac{1}{5}$	2 $\frac{2}{4}$
Juv.	,, . . .	26.7.6.156	7 $\frac{4}{5}$	3 $\frac{2}{5}$	1 $\frac{4}{5}$	1

SKULL.—The only available adult ♂ skull of *F. l. mellandi* belongs to the skin from Choma, Northern Rhodesia (D. Gordon Lancaster, 35.9.1.154). It has a condylobasal length of 97 mm. and the same robust build, indicating slight muscular moulding as the adult ♂ skulls of *F. l. cafra* and *F. l. griselda* described below. The following measurements illustrate the difference in shape between this skull and the adult ♂ skull of *F. l. ugandae*. As an example of the latter, I have selected the largest available skull which came from Kamdini, Gulu, Uganda (C. R. S. Pitman, 30.8.1.32). So far as it is possible to judge, the two skulls are approximately the same age, both being fully adult. Some of their dimensions are as follows, those of the Uganda skull being in brackets: condylobasal length, 97 (100); mastoid width, 46 (42); zygomatic width, 78 (74); cranial width, 49 (44); postorbital width, 35 (30).

It will be seen that the Uganda skull, although actually longer, is noticeably considerably narrower than the Northern Rhodesian skull.

The upper carnassial (pm^4) of the skull from Choma is 11 mm. long and 5$\frac{1}{2}$ mm. wide in front; but in a young adult ♂ skull from the Sesheke district, Northern Rhodesia (D. Gordon Lancaster, 35.9.1.159), the tooth is also 11 mm. long, but only 4 mm. wide, owing to diminution of the inner lobe such as may occur in the two South African races described below. In both these skulls, this tooth is smaller than in *F. l. cafra*.

SPECIMENS IN THE COLLECTION

1	Fort Liwindi, Upper Shire, Nyasaland (F. Whyte)	Sir H. H. Johnstone [P]	94.6.7.5
1	Zomba, Nyasaland	Sir A. Sharpe [P]	95.7.22.1
1	Mpika, North-east Rhodesia	F. H. Melland [C & P]	4.3.11.2 (*type*)
	Mpika, North-east Rhodesia (F. H. Melland), 4,750 ft.	Zoological Society [P]	7.9.11.1
1	Loangwa Valley, Northern Rhodesia	S. A. Neave [C & P]	7.1.11.17
1	Broken Hill, Northern Rhodesia, 3,800 ft.	Capt. C. R. S. Pitman [P]	33.3.6.17
♀	Kashitu, North-west Rhodesia		
1	Kafue-Zambesi Rivers (D. Gordon Lancaster)	Percy Sladen Trust [P]	35.9.1.151
♂	Choma, Northern Rhodesia (D. Gordon Lancaster)	,, ,,	35.9.1.154

♂ skull	Sesheke Dist., Northern Rhodesia (D. Gordon Lancaster)	Percy Sladen Trust [P]	35.9.1.159
2	Shamakanda, Mumbwa Dist., Kafue River, Rhodesia	Capt. C. R. S. Pitman [P]	32.9.1.52–53
1	Chipeluns, Namwala District, Rhodesia	,, ,,	32.9.1.54
1	Banga, Namwala District	,, ,,	32.9.1.55
2	Shamabanzas, Nansanga River, Namwala District, Rhodesia	,, ,,	32.9.1.56–57
2	Balovale, Northern Rhodesia	T. Vaughan Jones [P]	37.1.4.41–42
1	Lake Mweru	Sir A. Sharpe [P]	94.3.8.2
2 ♀, 1 ♂	Luluabourg, Kasai, South Belgian Congo (Père R. Callewaert)	Purchased	26.11.1.66 26.7.6.156 27.12.21.22–23

Felis lybica pyrrhus, Pocock

1944. *Felis lybica pyrrhus*, Pocock, Ann. Mag. Nat. Hist., 11 ser., 11, p. 131, (Sogera, on the road from Bokoio to Luimbale, Benguella).

Geographical Distribution.—Southern Benguella, in Angola, about 16° E. and 12° S.[1]

Diagnosis.—A bush-cat resembling and intergrading with *F. l. mellandi*, but distinguished on the average by the richer hue of the under side, the more buffy, less uniformly dark grey tint of the flanks, and the more conspicuous pattern.

Colour.—The type (37.5.12.9) has the general colour above greyish brown, with the spinal area blackish, but not very sharply defined laterally, and a good deal of brightish buff on the side behind the shoulder, spreading upwards from the chest; the wool on the flanks is rich buff at the summit, but on the crest it is mostly sooty grey, only slightly tinged with buff on the loins. The crown of the head is noticeably darker than the nape and the backs of the ears are deep rusty brown; there is no white on the face, the patches between the eyes being buff, the summit of the muzzle rusty brown, and the upper lip and lower cheek rich buff; the chin and interramal area are buff and defined behind by a reddish collar continuous with the lower genal stripe, the rest of the under side is rich ochreous red; the pattern of the upper side consists of fairly well-defined grey-brown stripes, becoming stronger on the thighs; the spots below are rusty or rusty brown, and there is a deep red-brown collar on the hind throat; the fore leg is mostly rich golden ochreous down the front, with a good deal of black behind and strong black stripes; the hind legs are defective.

A second skin (37.5.12.10), from Umbulu or Evavaela, a village, also in the Umbundu district, on the Luimbale-Balundu road, differs from the type in being greyer, not so brown above and less richly coloured below, but the pattern is nearly as well defined.

Several additional skins in the Quex Museum connect the foregoing and supply further evidence of individual variation in the race. They are indicated

[1] All except one of the known skins of this cat were purchased from natives by the Misses D. and A. Powell Cotton, and most of them are preserved in the museum at Quex Park, Birchington, Kent.

by the collectors' numbers. One (59) from the same spot as the last described skin closely resembles it except that the pattern is very faint. A topotype (5) closely matches (59), and differs therefore from the type in being greyer above, paler below, and in the faintness of the pattern. A skin (17) from Bokoio, on the Luimbale road, is nearly as red as the type below, but has the pattern faint and the upper side definitely darkish grey, pepper-and-salt. Another (31) from the same place has a similar grey hue above, is paler below, but has the pattern nearly as strong as in (58); a third (25) from the same place is deep red below, with the pattern above very faint, as in (17). A skin from Kangombo (164) has the dark pepper-and-salt grey hue above and the pattern of (31), and of two of a set from Kambango, one (149) closely matches (17) in its deep red hue below, pepper-and-salt grey hue above and indistinct pattern, whereas another (150) closely matches (50) in its very distinct pattern, which is, however, more spotty, and in colour, but has the patches between the eyes, the cheeks and chin white.

The skin of a kitten, from the same locality as the type, has a head and body measurement of 12 inches, and is therefore about half-grown. The ground colour of the upper side is pale ochreous with a sprinkling of white-tipped hairs and fading to buff below, the crown of the head being brown; the ears are rusty brown with darker tips; the pattern is blackish-brown and strongly pronounced, nearly concealing the ground colour of the upper side from the shoulders backwards; there is some white on the chin and throat, but none elsewhere.

A youngish native skin from Mount Moko, Luimbale (Dr. K. Jordan, 35.1.6.72), is not so rich-tinted below as the foregoing adult skins, and has no appreciable pattern. It connects this race with *F. l. mellandi*.

No flesh measurements or skulls are available.

Specimens in the Collection

1	Mount Moko, Luimbale, Benguella	Dr. Karl Jordan [C & P]	35.1.6.72
1	Sogera, Bokoi-Luimbale Road, Benguella	Misses D. and A. Powell Cotton [C & P]	37.5.12.9 (*type*)
1	Umbulu or Evavaela, Lumbale-Balundu Road, Benguella	Misses D. and A. Powell Cotton [C & P]	37.5.12.10

Felis lybica cafra, Desmarest

1822. *Felis cafra*, Desmarest, Encyclop. Méthod., Mamm. Suppl., p. 540 (Kaffraria).

1826. *Felis caffra*, A. Smith, Descr. Cat. S. Africa. Mus., p. 10; *id.* S. Afr. Quart. Journ., 2, p. 123, 1834; Layard, Cat. Mamm. S. Afr. Mus., p. 39, 1861; Elliot, Mon. Felidae, pl. 31, 1883; Lydekker, Handb. Carnivora, 1, p. 155, 1895; W. L. Sclater, Mamm. S. Africa, 1, p. 42, 1900.

1827. *Felis caligata*, Temminck, Mon. Mamm., p. 123 (in part); Smuts, Enum. Mamm. Cap., p. 30, 1832.

1902. *Felis lybica obscura*, Anderson and de Winton, Mamm. Egypt, p. 175 (not *F. obscura*, Desmarest, which is *F. catus*).

1904. *Felis ocreata caffra*, Schwann, Ann. Mag. Nat. Hist., 7th ser., 13, p. 425 (and of most subsequent authors, including Shortridge, Mamm. S.W. Africa, 1, p. 92, 1934).

1926. *Felis ocreata namaquana*, Thomas, Ann. Mag. Nat. Hist. (9), 17, p. 180 (in part, the type from Klipfontein, Little Namaqualand).

1928. *Felis ocreata rusticana*, Thomas, Ann. Mag. Nat. Hist., 10th ser., 1, p. 319 (Zuurbron, near Wakkerstrom, Transvaal).

1944. *Felis lybica cafra*, Pocock, Proc. Zool. Soc., 114, p. 297.

Geographical Distribution.—South Africa, south of the Orange River from the Cape of Good Hope and Little Namaqualand in the west to Kaffraria and Natal, and thence northwards to the Transvaal.

Diagnosis.—Closely resembling *F. l. ugandae* in colour and pattern, two colour phases, the "iron-grey", with black and whitish speckling, and the "tawny-grey", with less black and more buffy speckling, occurring in the same locality, but distinguished by its more luxuriant coat, by a pronounced tendency in the grey phase for the development of black pigment on the fore leg, especially on the pale areas about the "bracelets", and by some skull characters of the ♂ mentioned in greater detail below. Distinguished from *F. l. mellandi* by the dominance of the "tawny-grey" phase, by the more luxuriant coat, and by the blackness of the fore leg and darker ears in the "grey phase", but apparently resembling it in cranial characters. It also closely resembles the North African race *F. l. sarda* in coat and colour, but has a noticeably larger skull.

Colour.—The marked individual variation in the colour of the upper side is as described above. The wool of the spinal area may be sooty from the shoulders to the loins, or mainly ochreous. The ears also vary from dark brown to rusty brown, the tips being frequently blackish and pencilled, and the under side varies from deep orange ochreous to palish buff, with the tips of the hairs whitish to a greater or less extent. The pattern of stripes and spots on the upper side may be distinct, but is never strongly pronounced, and may be practically obsolete; the spots on the under side may be black and conspicuous, brown or reddish and less in evidence or hardly detectable; the stripes on the tail and legs are stronger than on the body, but vary in distinctness; a common feature in skins of the "iron-grey" phase is the black pigmentation of the fore legs above the elbow, the normally pale area between the two bracelets being sometimes deep black, sometimes dark grey, but frequently pale ochreous, in which case these two bands are well defined. The variations above enumerated may occur in skins from the same district.

An undated, unmeasured ♀ topotype of *cafra*,[1] without skull, from Kaffraria (G. C. Shortridge, 35.9.1.155), has the general colour above dark grey with a buff cast, the contour hairs of the flanks being speckled buffy white and fuscous,

[1] The type *F. cafra* was described by Desmarest as fulvous grey above, fulvous below, the ears being without pencils and the same tint as the upper side; there are three collars on the throat, twenty brown bands on each flank, eight on the front leg, and twelve on the hind leg; the long tail having four well-marked rings and a black tip. The description was based upon two specimens killed by Delalande in Kaffraria which is the type locality, not the Cape of Good Hope, as has been stated.

with the crest more heavily blackened and its pale speckling a little deeper; on the hinder part of the back to the root of the tail the spinal band is differentiated into two thin black stripes; the wool of the sides is rich buff at the summit, that of the spinal area is also rich buff behind the shoulders, but on the mid-back it is dark greyish brown, the brighter hue setting in again over the loins. The ears are darkish rusty ochreous. The crown is rubbed, the only pattern preserved on the head being the normal four streaks behind the eyes and the two red genal stripes. The lateral pattern consists of numerous faint stripes extending from the shoulders to the loins and a little darker than the greyer ground colour; on the hind leg the stripes are black from the thighs to the hock and on the fore leg from the elbow to the wrist; there is no excessive development of black about the elbow and the two bracelets are separated by a wide pale buff area. On the under side the chin and fore throat are white, the hind throat rather rich buff with one complete and two incomplete reddish collars; the chest and abdomen are rich ochreous buff, overcast with the white ends of the hairs and the spots are deeper reddish; the tint of the backs of the thighs is rich, almost orange ochreous, and the back of the hind leg is black from the pads to the hock. The tail has four black rings and a black tip sharply emphasised by the greyish white interspaces.

A ♀ skin from King Williamstown (H. Trevelyan, 80.10.11.1) closely resembles the foregoing, but the fronts of the legs are grey instead of buff, and the area between the bracelets on the fore legs is tinged with black.

Two specimens from practically the same locality in Natal show striking individual differences. An adult ♀ from Willbrook, Estcourt, 4,500 ft. (R. C. Wroughton, 4.12.5.13), September 1, very closely resembles in almost every respect the topotype from Kaffraria, the colour and pattern of the upper and under sides, the tint of the ears and the disruption of the spinal band posteriorly into black stripes being the same; but there is more black about the elbow of the fore leg and the tail stripes are not so sharply defined. Also, there are some stripes on the crown of the head which cannot be verified in the topotype. Another adult ♀ from Hidcote Highlands, Estcourt, 4,900 ft. (C. W. Turner, 5.5.1.8), October 9, is differently coloured, the pale areas of the contour hairs being clearer silvery, and there is more black pigment in the pelage, generally, of the upper side. The wool of the flanks is duller in tint and of the spinal area sooty brown almost throughout. The ears are dull greyish brown without ochreous or rusty hue, and are not nearly so sharply contrasted with the crown of the head. The lateral stripes are more pronounced, there are black stripes, but not very well defined, on the crown, nape and shoulders, and the spinal band is even more subdivided than in the Kaffrarian topotype and the other skin from Estcourt. The rich hue of the under side is over-sprinkled with grey, not white; and the area between the bracelets is deep dusky grey or pale black, as in the skin from King Williamstown.

To the west of Natal and Kaffraria, at Deelfontein, in the centre of the Cape Province, four skins (C. H. B. Grant), April–May, exhibit individual differences similar to those between the two from Estcourt. Two (2.12.1.1 and 2) exactly match the Kaffrarian topotype and Wroughton's skin from Estcourt in the

colour of the upper side, but 2.12.1.1 is richer tinted below than the other, and has the backs of the fore legs intensely black, rather blacker than in the skin from King Williamstown and in Turner's Estcourt skin, whereas in 2.12.1.2 the bracelets are widely separated by a buff area, as in the Kaffrarian skin. In 2.12.1.3 and 3.1.4.17 the fore legs are heavily black-pigmented behind, as in 1, but 3.1.4.17 is dark silvery grey above, as in Turner's Natal skin, 3 being intermediate in tint above, between it and 2. The ears in most of these skins are darkish rusty ochreous, as in the Kaffrarian and Natal skins, not as in Turner's Natal skin, but in 3.1.4.17 the rusty hue is apical, the base of the ears being deep greyish brown, closely matching the head. Great contrast in the tint of the under side is shown by 2.12.1.1, in which it is intensely, almost orange ochreous with reddish brown spots, and by 3.1.4.17, in which it is palish buff with black spots.

A female skin from Cape Agulhas (F. C. Selous, 95.9.3.3) closely matches Turner's Natal skin in the tint and pattern of the upper side and the Deelfontein skin (2.12.1.4) in the same respect, as also in the extensive blackness of the posterior surface of the fore leg.

A series of four skins from Klipfontein, in Little Namaqualand (C. H. B. Grant), May, representing *namaquana*, Thomas,[1] exhibit individual variations similar to those of the Deelfontein series. One (4.2.3.21) exactly matches the skin from Cape Agulhas in practically every detail, except that the buff tint of the spinal wool sets in a little farther back. But the type of *namaquana* (4.2.3.20) and the remaining two (4.2.3.22 and 23) are like the Kaffrarian topotype of *cafra* and Wroughton's Natal skin in being buffier and not so silvery and black. The spinal wool in the type is mostly rich ochreous throughout, only a little darker and duller in the middle of the back; but 4.2.3.21 has the wool mostly deep sooty grey, but slightly buffy far back on the loins and on the shoulders; the tint of the lower side varies in intensity and the spots from reddish to black. In the three paler skins the ears are rusty ochreous, but in 4.2.3.21 they are darker and less rusty.

Skins from the Transvaal exhibit the same two colour phases of the upper side as those from Natal and the central and western districts of the Cape Province, and are racially indistinguishable from them. The type and topotype of *F. ocreata rusticana*,[2] Thomas, from Zuurbron, near Wakkerstrom, 4,500 ft., south-east Transvaal (C. H. B. Grant, 4.9.1.27 and 26), are of the tawny type, matching skins from Deelfontein (2.12.1.1 and 2), from Klipfontein (4.2.3.20.22 and 23), and very closely resembling the Kaffrarian topotype of *cafra* and the tawny skin from Estcourt, Natal. They differ from each other in the distinctness

[1] Thomas based his description of *namaquana* upon a skin from Berseba in Great Namaqualand and upon the Klipfontein skin (4.2.3.20), stating the latter to be the type. He also took Selous's Cape Agulhas skin as representing typical *cafra* and separated *namaquana* on the evidence of the two paler skins from Berseba and Klipfontein respectively, entirely ignoring the practical identity between another of the Klipfontein skins and Selous's specimen from Cape Agulhas.

[2] Thomas contrasted the three paler Transvaal skins, which he named *rusticana*, with the dark skin collected by Selous at Cape Agulhas, taking the latter as representing typical *cafra*; but he ignored the dark Transvaal skin from Klein Letaba which closely resembles the Cape Agulhas skin.

of the pattern, the stripes on the legs in the type being rather faint and the rings on the tail thin and wide apart, whereas in the topotype the leg stripes are black and strong and those on the tail normally thick and spaced; the tail in the topotype, indeed, is unusually well banded, there being seven or eight stripes on its upper side. In both skins the colour of the lower side is of average brightness, with reddish brown spots. A ♀ skin from Turfloop, 18 miles east of Pietersburg, in Zoutpansberg, North Transvaal, 4,450 ft. (C. H. B. Grant, 6.8.2.14), March, also referred by Thomas to *rusticana*, is abnormally coloured above with an erythristic tinge, the spinal area being mainly reddish, with hardly a trace of black, and the lateral stripes reddish and contrasted with the generally tawny grey hue of the flanks; the under side is more overcast with white than in the skins from Zuurbron.

An adult ♂ skin from Klein Letaba, in Zoutpansberg, North Transvaal (C. H. B. Grant, 5.12.9.15), August 21, left unidentified by Thomas, is of the dark silvery grey colour-phase above, matching Turner's skin from Estcourt, Natal, the skin from Deelfontein (2.12.1.3), and the skin from Klipfontein (4.2.3.21), the last-mentioned almost exactly; there is no appreciable pattern on the body above and the spinal wool is sooty brown almost throughout.

Skull.—The skull is apparently slightly longer than in the two admitted

Measurements

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
			in.	in.	in.	in.
♂ ad.	Klein Letaba, Zoutpansberg, Transvaal . . .	5.12.9.15	23 3/4	15	6 3/5	2 3/4
♂ ad.	Zuurbron, Wakkerstrom Dist., Transvaal (type of *rusticana*) . . .	4.9.1.27	21	13	5 3/5	2 1/4
♂ yg.	Zuurbron, Wakkerstrom Dist., Transvaal . .	4.9.1.26	21 1/2	14	5 1/2	2 3/4
ad.	Turfloop, Pietersburg, Transvaal	6.8.2.14	21	13	5 3/5	2 3/4
♂ ad.	Willbrook, Estcourt, Natal .	5.5.1.8	22 3/5	12 3/5	5 1/2	2 1/2
♀ ad.	,, ,, ,, .	4.12.5.13	20 4/5	11 3/5	4 1/2	2 3/5
♂ ad.	Deelfontein, Cape Province .	2.12.1.1	23 1/2	14 1/2	5 3/5	2 4/5
♂ ad.	,, ,, ,, .	2.12.1.2	22 1/2	14 1/2	6 3/5	2 3/5
♂ ad.	,, ,, ,, .	2.12.1.3	21 1/2	12 +	5 3/5	2 1/2
+ yg. ad.	,, ,, ,, .	3.1.4.17	18 4/5	12 3/5	5 1/2	2 1/2
♂ ad.	Klipfontein, Little Namaqualand (type of *namaquana*) .	4.2.3.20	23 3/5	13 1/2	6	3
♀ ad.	Klipfontein, Little Namaqualand	4.2.3.23	21 1/2	13 3/5	5 1/2	2 1/2
♀ ad.	Klipfontein, Little Namaqualand	4.2.3.21	21 1/2	13 3/5	5 3/4	2 4/5 +
♀	Klipfontein, Little Namaqualand	4.2.3.22	19 1/2	11 1/2	5 3/5	2 1/2

Skull Measurements of *Felis lybica cafra*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	*pm^1*	*m_1*
			mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Klein Letaba, Zoutpansberg, North-east Transvaal .	5.12.9.15	(112)	(102)	(76)	—	37	22	27	—	74	12	10
♂ yg.	Zuurbron, Wakkerstrom . . .	4.9.1.26	96	90	66	48	39	18	24	23 : 17	63	12	9
♂ ad.	South Africa . .	46.3.28.4	112	(102)	78	50	37	20	27	—	73	12	9
♂ ad.	Deelfontein . .	2.12.1.1	106	96	74	48	37	21	27	23 : 16	71	12	9
♂ ad.	,, . .	2.12.1.2a	104	96	74	46	35	19	25	23 : 18	69	12	9
♂ ad.	,, . .	2.12.1.2	102	93	74	48	37	20	26	22 : 16	69	12½	9
♂ ad.	Klipfontein (type of *namaquana*) .	4.2.3.20	107	99	76	48	35	20	26	23 : 16	71	12½	10
♀ ad.	Turfloop, Zoutpansberg . . .	6.8.2.14	94	87	66	46	35	17	23	21 : 16	62	10½	8
♀ ad.	Zuurbron, Wakkerstrom (type of *rusticana*) . .	4.9.1.27	97	88	70	44	33	18	24	21 : 15	65	12	9
♀ ad.	Estcourt, Natal .	5.5.1.8	99	91	—	43	30	17	23	21 : 15	64	11	9
♀ ad.	,, ,, . .	4.12.5.13	97	88	67	45	35	16	23	21 : 15	65	11	9
♀ ad.	Newcastle, Natal .	94.1.6.1	97	89	68	46	36	18	24	22 : 17	64	11	9
♀ ad.	King Williamstown .	80.10.11.1	—	91	67	—	—	19	23	—	66	11	9
♀ ad.	Deelfontein . .	2.12.1.3	100	92	67	46	38	19	24	22 : 18	67	10½	8
♀yg. ad.	,, . .	3.1.4.17	90	82	64	45	37	16	22	21 : 15	59	11	8
♀ ad.	Cape of Good Hope	47.6.9.7	—	(91)	70	46	34	19	26	—	66	10½	8
♀ ad.	,, ,, ,,	119a	—	(89)	65	46	36	17	25	23 : 18	64	11	9
♀ ad.	Cape Agulhas . .	95.9.3.3	—	(86)	—	—	34	17	24	—	61	11	9
♀ ad.	Klipfontein . .	4.2.3.21	99	91	69	47	37	18	25	23 : 17	65	11	9
♀ ad.	,, . .	4.2.3.23	98	89	70	48	37	18	25	21 : 17	64½	11	8
♀ ad.	,, . .	4.2.3.22	91	84	66	48	40	17	22	21 : 17	61	11	8

races found in Uganda, Kenya Colony, and Tanganyika Territory, namely *F. l. ugandae* and *F. l. taitae*, the average condylobasal length in six ♂♂ and twelve ♀♀ of *F. l. cafra* being respectively 98 and 89 mm. as compared with 94 mm. in seven ♂♂ and 86 mm. in nine ♀♀ of the two more northern races. But it is also relatively wider in *F. l. cafra*, as it is in *F. l. mellandi*. The average zygomatic, cranial and postorbital widths in six adult ♂♂ of *F. l. cafra* are respectively 75, 48 and 36 mm., the same averages in adult ♂♂ of *F. l. ugandae* being respectively 71, 44 and 30 mm. Also, the average length of the upper carnassial (*pm*^{1}) in seven ♂♂ of *F. l. cafra* is 12½ mm., whereas in eight ♂♂ of *F. l. ugandae* it is a little over 11 mm.

Two adult ♂ skulls from Deelfontein may be cited to illustrate individual variation in shape in the same locality. One (2.12.1.1) adult, but not old, has the temporal ridges 17 mm. apart at the suture and the frontals inflated in front, giving a steep slope to the nasals, and expanding the interorbital area, which is 21 mm. wide. Another (2.12.1.2a), about the same age, has the ridges 14 mm. apart, the frontals not so inflated so that the slope of the nasals is not so abrupt, the interorbital area is narrower, 18 mm. wide, and the nasals are more constricted, 5 mm. wide at the frontal points. In a ♂ skull (46.3.28.4), labelled South Africa, which is older than the two from Deelfontein and as old as the skull of *F. l. ugandae* from Gulu, the ridges are only 6 mm. apart. The following measurements of these two skulls, those of the Uganda skull being put in brackets, well illustrate the differences in cranial and dental dimensions between the two races: condylobasal length, 102 (100); zygomatic width, 78 (74); cranial width, 50 (44); postorbital width, 37 (30); length of *pm*^{4}, 12 (11). The considerably greater cranial and postorbital widths of the South African skull attest the suppression of the muscular moulding characteristic of adult ♂♂ of this race.

An interesting variation in the structure of *pm*^{1} is exhibited by one of the skulls from Klipfontein. As a rule, in this South African race the anterior width of the tooth is about half the total external length or a little less. For instance, in one ♀ (4.2.3.21) from Klipfontein the length is 11 mm. and the anterior width 5½ mm. But in another ♀ (4.2.3.22) from the same locality the length is also 11 mm., whereas the anterior width, owing to reduction in size of the inner lobe, is only 4 mm. In this feature this particular skull resembles some of those referred to the next race, in which it occurs sporadically.

Specimens in the Collection

♂	Klein Letaba, Zoutpansberg, N. Transvaal (C. H. B. Grant)	C. D. Rudd [P]	5.12.9.15
	Turfloop, 18 miles east of Pietersburg, N. Transvaal (C. H. B. Grant)	,, ,,	6.8.2.14
♂	Zuurbron, 30 miles east of Wakkerstrom, South-east Transvaal (C. H. B. Grant)	,, ,,	4.9.1.27 type of *rusticana*
			4.9.1.26
	Willbrook, Estcourt, Natal	R. C. Wroughton [C & P]	4.12.5.13
	Hidcote, Estcourt, Natal	C. W. Turner [P]	5.5.1.8
♀	Newcastle, Natal	Col. E. S. Butler	94.1.6.1

♀	Kaffraria	G. C. Shortridge [C & P]	35.9.1.155
♀	King Williamstown	H. Trevelyan [C & P]	80.10.11.1
	Port Elizabeth (A. W. Guthrie)	Zoological Society [P]	39.671
1	South Africa	Purchased	43.12.7.21
♂	,, ,,	,,	46.3.28.4
1	The Cape	,,	47.6.14.7
♀	Cape of Good Hope (marked ♂)	J. Gould [P]	119a
1 mtd.	,, ,, ,,	Purchased	38.6.9.116
1	,, ,, ,,	,,	39.11.11.23
Juv.	,, ,, ,,	,,	119 d
1	,, ,, ,,	,,	119e
1	,, ,, ,,	Earl of Derby [P]	119f
♀	Cape Agulhas	F. C. Selous [C & P]	95.9.3.3
3 ♂, 2 ♀	Deelfontein, Cape Province (C. H. B. Grant)	Col. A. Sloggett [P]	2.12.1.1,2,2a,3; 3.1.4.17
♂	Klipfontein, Little Namaqualand (C. H. B. Grant)	C. D. Rudd [P]	4.2.3.20 type of *namaquana*
3 ♀	Klipfontein, Little Namaqualand (C. H. B. Grant)	,, ,,	4.2.3.21–23

Felis lybica griselda, Thomas

1926. *Felis ocreata griselda*, Thomas, Ann. Mag. Nat. Hist., 9th ser., 17, p. 180 (50 miles south of Dombe Grande, Benguella).

1920. *Felis ocreata namaquana*, Thomas, Ann. Mag. Nat. Hist., 9th ser., 17, p. 180 (in part only, the specimen from Berseba, not the type from Klipfontein); *id.* Proc. Zool. Soc., pt. 1, p. 102, 1929.

1926. *Felis ocreata xanthella*, Thomas, Proc. Zool. Soc., p. 291 (Uknalukasi, North-west Ovamboland); *id.* Proc. Zool. Soc., pt. 2, p. 374, 1927.

1932. *Felis ocreata vernayi*, Roberts, Ann. Transvaal Mus., 15, p. 6 (Tsotsorogo Pan, North Bechuanaland).

1944. *Felis lybica griselda*, Pocock, Proc. Zool. Soc., 114, p. 299.

Geographical Distribution.—From Southern Angola, Ovamboland, Kaokoveld, Damaraland, eastwards into Bechuanaland and southwards into Great Namaqualand.

Diagnosis.—Intergrading with *F. l. cafra*, but distinguished by its paler, brighter ochreous ears, slightly or considerably paler general hue, and by the pattern above and below being on the average suppressed to a greater extent. Also by a difference in its colour phases, one phase, the darker, being tawny with a grey cast, only slightly different from the paler, tawny phase of *cafra*, the other being much lighter and whitish, strikingly different from the heavily pigmented dark phase of *cafra*, which is unknown north of the Orange River in South-west Africa.[1]

[1] From Little Namaqualand in the south to Angola in the north there is an almost complete gradation in colour between the blackish type of *cafra*, which occurs at Klipfontein, and the whitish type of *griselda*, which occurs at Benguella, the tawny intermediate type, which is also found at Klipfontein, being dominant in Great Namaqualand, Damaraland, Kaokoveld, and Ovamboland. The occurrence of the whitish type at such widely separated localities as Central Kaokoveld, Benguella. and northern Bechuanaland, with the tawny type coming in between, shows the impossibility on the available evidence of admitting their racial status. They appear to be merely sporadic varieties.

Colour.—The type of *F. o. xanthella*, an adult ♀ from Ukualukasi, North-west Ovamboland, 3,400 ft., 32 miles north-west of Rehoboth Mission (25.12.4.33), October 8, has the contour hairs 30 mm. long on the flanks, 45 mm. on the crest, but they are thinning out, apparently with the moult, so that the buffy wool beneath is displayed to a great extent, imparting the yellowish appearance which suggested the name. The general colour of the contour hairs on the sides is buffy white, with faint fuscous or blackish speckling; on the crest the pale areas are richer buff, with more extensive and deeper black speckling; the wool of the flanks is pale buff at the summit, of the crest richer buff from the shoulders to the root of the tail. The backs of the ears are pale brightish ochreous. There is no pattern on the head apart from the normal short streak above the eyes and the small patch in front of them, and the red genal stripes, the nose being reddish; there are no appreciable lateral stripes on the body; but the legs have greyish brown bands, and there is a single strong stripe on the inner side of the fore leg; the usual black on the posterior surface of the hind foot only extends a short way above the plantar pad. On the under side the chin and throat as far back as the red collar are white; the chest between the fore legs and the middle of the belly are also white, the rest being pale ochreous diluted with white and the backs of the thighs down to the hocks are rich ochreous.

An adult ♂ specimen from Sandfontein, in the Gobabis district, East Damaraland, 4,100 ft. (26.12.7.30), November 25, is an almost precisely similar cat in every way, except that the under side is considerably brighter, an individually variable character;[1] the back of the hind leg is only black in its lower half.

A skin from Karolinenhof, near Sandfontein, 4,000 ft. (G. C. Shortridge, 26.12.7.29), December 11, is greyer, darker and less buffy than the one from Sandfontein and the type of *xanthella*, mainly because the coat is closer, concealing the underlying wool. The contour hairs of the flanks have less extensive pale areas and those of the spinal area are grey, not so buff; the wool of the flanks is pale buff, of the spinal area dusky greyish brown in front, becoming gradually paler and more buffy over the loins; the pattern on the legs is more strongly pronounced and black, the back of the hind leg is black to the hock, and the spots on the lower side are stronger.

Two adult ♂ skins from Kovares, South Kaokoveld (Shortridge, 28.9.11.86 and 87), differ only in minor individual details from the skins from the Gobabis district of Damaraland, from Great Namaqualand, and from the type of *xanthella* from Ovamboland. But an immature ♂ skin from Otjitundua, in Central Kaokoveld, 1,348 metres (Shortridge, 28.9.11.88), is of special interest on account of its much paler hue, the contour hairs, except on the spinal area, being white with fine fuscous speckling, giving a pale whitish grey hue to the upper side; the contours of the spinal area are banded pale buffy grey and black; the wool of the flanks is very pale buff, of the spinal area rich buff over the shoulders, dark sooty grey with scarcely a trace of buff on the mid-back, and

[1] Thomas (*Proc. Zool. Soc.*, 1927, pt. 2, p. 374) identified this specimen as *xanthella*; but subsequently, in his bound volume of tracts and on the label, erased the name and substituted *namaquana*, apparently because of the great distance between the localities where the cats were killed.

pale buffy over the loins; the ears are the same tint as in the other skins; there are faint fuscous lateral stripes, due probably to the immaturity of the specimen, and on the legs the stripes are strong and black; on the under side the white interramal area is defined by a red collar, the hind throat is rich buff with a red collar; the chest is buff, over-sprinkled with white, with fuscous spots, and the abdomen and inner side of the thighs are white; the legs are buff in front and the hind foot is black.

A ♂ topotype of *F. o. vernayi* from Tsotsorogo Pan, North Bechuanaland, 18° 45′ S., 24° 20′ E. (Vernay and Lang, 33.9.6.6), is almost exactly the same whitish grey hue above as the last. The wool of the flanks is dull buffy grey, of the spinal area deep and blackish in front, but greyish buff over the loins; the lateral pattern has disappeared, but the stripes on the legs are black and strong, as in the Kaokoveld skin, but the front of the legs are greyer, not so buff, and the black on the hind leg does not reach the hock; the lower side is more over-sprinkled with white.

The type of *F. o. griselda*[1] from 50 miles south of Dombe Grande, Benguella (E. N. Buxton, 25.5.16.1), is an exact match of the topotype of *vernayi* in its pale whitish hue above, but the spinal wool on the loins is richer buff and the lower side is not so clear white, having a faint buffy tinge, perhaps due to artificial soiling.

MEASUREMENTS

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*
			in.	in.	in.
♂ ad.	Berseba, Great Namaqualand	25.1.2.42	24½	14⅝	6
♂ ad.	Karolinenhof, Kalahari	26.12.7.29	24⅜	11⅝	6¼
♂ ad.	Kovares, South Kaokoveld	28.9.11.87	23⅝	13⅜	5¾
♂ ad.	Sandfontein	26.12.7.30	23⅝	13⅝	6¼
♂ ad.	Okavango, Grootfontein District	35.9.1.153	23⅜	13⅜	6
♂ ad.	,, ,, ,,	35.9.1.145	23¼	13¼	6⅛
♂ ad.	Kovares, South Kaokoveld	28.9.11.86	22⅝	11⅝	5¾
♀ ad.	Ssanukana, Grootfontein District	35.9.1.148	23¼	14⅜	6¼
♀ ad.	North-west Ovamboland (type of *xanthella*)	25.12.4.33	22	14¼	5¾
♀ ad.	Numkaub, Grootfontein District	35.9.1.147	20⅝	12½	5¼
♀ ad.	Okavango, Grootfontein District	35.9.1.149	20⅝	12⅝	5⅛

SKULL.—With the condylobasal length varying from 90 to 100 mm., the average in eight being about 95 mm., the skulls of adult ♂♂ appear to be a trifle smaller than in *F. l. cafra*; but they have the same robust appearance as in that

[1] In his description of the type and only known specimen, Thomas separated it radially from *mellandi* by the "dull, pale, buffy whitish" hue and from the south-western form he named *namaquana* by the paleness "tending in the direction of grey instead of buffy". In his subsequent report on the Kaokoveld specimens he apparently noted the resemblance between the skin from Otjitundua and his type of *griselda*, without admitting the impossibility of separating them subspecifically.

SKULL MEASUREMENTS OF *FELIS LYBICA GRISELDA*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	*pm^1*	*m_1*
			mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Berseba, Gt. Namaqualand	25.1.2.42	102	94	76	49	37	20	26	23 : 15	67	12·6	10
♀	Sandfontein, Damaraland	26.12.7.30	102	92	70	47	35	19	26	23 : 17	68	12	9
♂	Karolinenhof, Damaraland	26.12.7.29	105	97	75	49	39	18	24	23 : 17	70	12	9
♂	Kovares, S. Kaokoveld	28.9.11.87	102	91	75	47	38	21	26	22 : 17	69	12	10
♂	Kovares, S. Kaokoveld	28.9.11.86	102	94	75	49	33	19	25	22 : 16	68	12	9
♂ yg. ad.	Tsotsorogo, North Bechuanaland	33.9.6.6	98	89	67	47	38	16	24	23 : 18	63	12	9
♂ ad.	Nyamgana Mission, Okavango	35.9.1.153	106	97	72	46	32	20	26	23 : 17	69	$11\frac{1}{2}$: 5	9
♂ old	Andara	35.9.1.145	102	93	72	47	32	20	26	23 : 16	67	12 : $5\frac{1}{2}$	10
♂ ad.	Kanoo Vley	35.9.1.158	—	(95)	74	—	36	19	25	22 : 15	68	12 : $5\frac{1}{2}$	9
♀ ad.	Ssanukanu	35.9.1.148	109	100	73	49	36	19	25	23 : 17	71	12 : 5	$9\frac{1}{2}$
♀ yg. ad.	Ukualukasi (type of *xanthella*)	25.12.4.33	99	90	67	47	35	16	23	22 : 16	62	$11\frac{1}{2}$	$8\frac{1}{2}$
♀ ad.	Numkaub	35.9.1.147	92	86	65	46	35	16	21	20 : 15	61	11 : 5	9
♀ yg. ad.	Okavango-Omatako Junction, Grootfontein	35.9.1.150	88	80	60	46	35	16	20	19 : 14	58	12 : 5	9

race and *F. l. mellandi*, resembling large adult ♀ skulls in the width of the cranial and postorbital areas due to the absence of the muscular moulding presented by adult ♂ skulls of *F. l. ugandae* and most of the other races.

A striking instance of variation in the size of the inner lobe of pm^4, attesting its systematic unimportance, is shown by two adult ♂ skulls from Kovares, South Kaokoveld. In one (28.9.11.86) this tooth is 12 mm. long and 6 mm. wide in front. In another (28.9.11.87) it has the same length, but the width, owing to reduction of the lobe, is only 4 mm. The difference is not due to wear, the first skull being the older of the two, with the main cusp of pm^4 more worn and the temporal ridges only 4 mm. apart at the suture, whereas in the second they are 14 mm. apart. In the skull from Sandfontein (26.12.7.30) the lobe is also small, the width of the tooth being $4\frac{1}{2}$ mm. and, as in 28.9.11.87, there is no trace even of the socket of pm^2, whereas in the skull from Karolinenhof (26.12.7.29) the width of pm^4 is 6 mm. and pm^2 is present on both sides. In the very old ♂ skull from Andara, West Caprivi (35.9.1.145), so old that the sagittal crest reaches the suture in front and all the teeth are extensively worn, pm^4 is 12 by 5 mm. and pm^2 is still retained. It is noticeable that despite its age the two postorbital processes on each side are widely separated.

Specimens in the Collection

♂	Berseba, Great Namaqualand (G. C. Shortridge)	Percy Sladen Trust [P]	25.1.2.42
♂	Karolinenhof, Gobabis Dist., Damaraland (G. C. Shortridge)	Percy Sladen Trust and Kaffrarian Mus. [P]	26.12.7.29
♂	Sandfontein, Gobabis Dist., Damaraland (G. C. Shortridge)	,, ,,	26.12.7.30
3	Bambi, Damaraland	Maj. Powell Cotton [C & P]	38.7.8.1–3
2 ♂	Andara, West Caprivi, Damaraland (G. C. Shortridge)	Percy Sladen Trust and S. Afr. Res. Board [P]	35.9.1.145–46
♀	Ssanukanu Village, Grootfontein Dis., Damaraland (G. C. Shortridge)	,, ,,	35.9.1.148
♀	Numkaub, Grootfontein District, Damaraland (G. C. Shortridge)	,, ,,	35.9.1.147
♂♀♂	Okavango, Grootfontein District, Damaraland (G. C. Shortridge)	,, ,,	35.9.1.149, 150, and 153
	Leopard's Kopje, Grootfontein Dist., Damaraland (G. C. Shortridge)	,, ,,	35.9.1.152
Skull	Kanoo Vlez, Grootfontein (G. C. Shortridge)	,, ,,	35.9.1.157,158
2 ♂♀ juv.	Kovares, South Kaokoveld Dis., Damaraland (G. C. Shortridge)	,, ,,	28.9.11.86–87,90
♂	Otjitundua, Central Kaokoveld Dis., Damaraland (G. C. Shortridge)	,, ,,	28.9.11.88
♂	Tsotsorogo Pan, North Bechuanaland (Lang)	A. S. Vernay [P]	33.9.6.6
♀	Ukualukasi, North-west Ovamboland (G. C. Shortridge)	Percy Sladen Trust [P]	25.12.4.33 (type of *xanthella*)
	50 miles south of Dombe Grande, Benguella, Angola	E. N. Buxton [C & P]	25.5.16.1 (type of *griselda*)

Felis lybica tristrami, Pocock

1867. *Felis syriaca*, H. B. Tristram, Nat. Hist. of the Bible, p. 67 (not *Felis domestica syriaca*, Fischer, ex Aldrovandi, Syn. Mamm., p. 107, 1829).
1935. *Felis ocreata*, Pocock, Ann. Mag. Nat. Hist., 10th ser., 15, p. 455.
1939. *Felis constantina syriaca*, Morrison-Scott, Novit. Zool., 41, p. 197.
1944. *Felis lybica tristrami*, Pocock, Ann. Mag. Nat. Hist. (11), 11, p. 125 (Ghor Seisaban, Moab, Palestine).

Geographical Distribution.—Palestine, Western and Southern Arabia.

Diagnosis.—A bush-cat[1] generally resembling those of North Africa in coloration, but differing on the average from *F. l. sarda* by its lighter tint, less luxuriant coat and less extensive blackness on the back of the metatarsus, from *F. l. brockmani* by this last character, as well as by the less distinct pattern on the body, and from *F. l. ocreata* at least by its shorter coat and smaller skull.

Colour.—The series of skins is, on the whole, tolerably uniform, the colour of the upper side varying from pale, slightly tawny grey, to duller or brighter ashy grey and on the under side from whitish to rich buff, almost ochreous; the face is well pigmented and the ears vary from rusty brown to darker greyish brown, darkening at the tips; the pattern on the upper side is always faint, sometimes hardly visible, and shows a tendency to break up into spots; it is never strong below, is typically weak on the outer sides of the limbs, and the black on the upper part of the back of the hind foot is less deep and less extensive.

The type, an adult ♀, from Ghor Seisaban, Moab (H. B. Tristram, 93.11.29.3), March 12, has the coat very soft, full and long, 44 mm. on the flanks, 47 mm. on the crest, the difference between them being very slight. The general colour above pale buffy white, darkened with fuscous speckling, the spinal area being deeper buff with black speckling; the wool on the flanks is rich buff, exposed to a certain extent by the thinning contour hairs, on the crest rich ochreous from the nape backwards; the ears are palish rusty brown, darkening at the tip, which is pencilled; the speckling of the crown spreads between the whitish patches bordering the eyes internally, the top of the muzzle is rusty, the cheeks buffy white with two red stripes, and the upper lip and chin are white; the legs externally are like the flanks, with the paws deeper buff. The pattern is obsolete on the head, nape and shoulders, faint on the flanks, weak and brown on the outer side of the legs, being strong and black only on the tail, apart from the bracelet. On the under side the throat, which has a fuscous collar, and the chest are superficially white, but buff below, and the white extends all down the middle line, narrow on the belly, but spreading over the inner side of the thighs; the spots are red, and there is some ochreous round the genitalia and on the backs of the thighs, whence it extends, gradually fading, to the hocks; the hind foot is only black distally behind, being greyish brown in the upper half.

An adult ♀ from Junction Station, Jerusalem (G. C. Shortridge, 18.8.1.8), April, has the coat 31 and 45 mm., thinner and a little shorter than in the type,

[1] According to Major Maurice Portal the cats of this race he saw at Ramleh inhabited country characterised by abundance of rocky outcrops and loose rocks affording them shelter and by tolerably thick scrub consisting of juniper and ilex.

but is like it in colour above, although ochreous below, the hairs being much less extensively whitened, with the stripes on the legs stronger; the hind foot is not "booted" in its upper part.

An unsexed skin labelled Palestine (M. Portal, 44.29) has the coat 39 and 40 mm., concealing the wool, but otherwise the colour of the contour hairs and of the wool is nearly the same as in the type, although the pattern is a little stronger; the ears are rubbed, but were apparently as in the type. A ♀ skin (44.28) with the same history has the coat 33 and 48 mm. and differs from the preceding in being more ashy grey above, the pattern everywhere more distinct and apparent on the nape and shoulders, the ears dark greyish brown with no rusty tint, the under side less white, more buffy and the spots blacker. A ♀ from Ramleh, 10 miles from Jaffa (M. Portal, 19.4.11.1), November, has the coat 30 and 42 mm., the ears dark, as in the last, but differs in being decidedly more silvery grey above, less buffy below, with the pattern on the legs and abdomen still blacker, and the hind foot blacker towards the hock. Another ♀ with the same history (19.4.11.2), December 20, has the coat 30 and 43 mm., and is more ashy grey above than the type, but a little darker and much less silvery than the other from Ramleh, and further differs from the latter in having less black on the spinal area, with the pattern less pronounced above and below, the under side less buffy and the hind foot not so black in its upper part. A young skin from near Jaffa (Sladen, 39.1667), June, has the coat 21 and 35 mm. and is hardly distinguishable from the type in superficial colour, including the ears, but differs in its much shorter coat and very pale wool, both seasonal features, and its more distinct pattern due to its short coat and immaturity.

The following three Arabian specimens are assigned to the same race. An adult ♂ from Iraq Well, Wadi Thar (17° 40′N., 44° 0′E.), 4,300 ft. (H. St. J. Philby, 40.175), November 6, with the coat 36 and 42 mm., matches the skin from Ramleh (19.4.11.2) in superficial colouring, except that the ears are paler, as in the type, and the wool is duller in tint, almost as in the skin from near Jaffa (Sladen, 39.1667). A ♀ skin from 15 miles north of Jidda, on the Red Sea coast (A. G. Griffin, 40.176), January, with the coat 31 and 35 mm., very closely resembles the first described skin collected by Portal, and its ears are as in the type. It may be noted that the pattern is greatly broken up into spots and that the black on the hind foot is restricted to its lower part. A young ♀ from north-east of Jidda (Philby, 40.177) differs from the preceding in being uniformly ashy grey all over, and the pattern above is practically obsolete, although present on the legs and below.

MEASUREMENTS

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
			in.	in.	in.	in.
♂ ad.	Wady Thar, Arabia . .	40.175	20	15⅜	5⅛	2⅛
♀ yg. ad.	Jerusalem	18.8.1.8	21⅛	13⅝	5	2⅛

SKULL MEASUREMENTS OF *FELIS LYBICA TRISTRAMI* AND *FELIS LYBICA IRAKI*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Maud. length*	pm^4	m_1
	F. l. tristrami		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Iraq Well, Wadi Thar, Arabia . .	40.175	98	90	68	45	34	19	24	22 : 15	65	11	9
♀ ad.	North of Jidda .	40.177	82	74	58	42	33	15	20	19 : 16	56	12	9
♀ ad.	15 miles north-east of Jidda . .	40.176	—	—	60	43	32	16	21	— : : 13	59	$10\frac{1}{2}$	8
♂?yg.ad.	Umm al Qurun, S. Arabia . .	40.177a	92	85	58	47	37	16	22	20 : 14	61	10	9
♀yg.ad.	Jerusalem . .	18.8.1.8	94	87	62	44	32	16	22	20 : 15	60	10	8
♀ ad.	Ghor Seisaban, Moab (type) .	93.11.29.3	87	80	62	43	31	16	21	20 : 17	57	11	8
♀ ad.	Ramleh, Jaffa . .	19.4.11.1	85	79	59	41	30	15	21	19 : 14	57	10	8
♀yg.ad.	,, ,, . .	19.4.11.2	84	78	59	44	32	15	20	19 : 14	55	11	$7\frac{1}{2}$
	F. lybica iraki												
♂ yg.	Koweit, Arabia (type)	20.1.19.2	93	85	64	46 ±	31	16	23	20 : 16	60	11	9

The given dimensions of the head and body and the tail of these two specimens suggest a difference in the method of measuring those two areas. It is unlikely that Philby's Arabian specimen, an adult ♂, with a condylobasal length of 90 mm., had a shorter head and body than Shortridge's Jerusalem specimen, a young adult ♀ with a condylobasal length of 87 mm.; and it may be noted that the total length from nose-tip to tail-tip in Philby's is slightly longer than in Shortridge's specimen. The relative dimensions of the latter are more normal, although large for a ♀, its skull being 7 mm. longer than that of the type.

Skull.—The skulls, which are about the same size as those of most of the North African races, show no distinctive features; but the teeth vary individually in size, as noticed in the two ♀ skulls from the north-east of Jidda by Morrison-Scott, who suggested that the smaller teeth might be due to the cat being of impure breed, with a domestic strain, but from the evidence of the other skulls the teeth in the young skull are exceptionally large. This race is interesting for two other reasons. As explained above (p. 10), the type of the alleged Cretan race, which carries the name *agrius*, Bate, is a feral domestic cat, but the topotype (5.12.2.14) in its more luxuriant coat and general colour closely resembles the type of *F. l. tristrami* from Moab, has the same pattern as the skin from Jerusalem, except that it is stronger on the nape and shoulders, and the dark ears of the skin from Ramleh. Its hind feet also have the black restricted to the lower portion. If this specimen represents, as is possible, an indigenous Cretan race, its close likeness to the Syrian race is interesting. On the scanty evidence it is not worth naming.

In the second place, the tendency in *F. l. tristrami* for the pattern on the flanks to be more spotty, for the disappearance of the black on the back of the metatarsi and for the lesser differentiation of the spinal crest, are all features leading towards the two more Eastern races, *ornata* and *caudata*, which in 1939 I assigned to the same species as the African Wild Cat.

Specimens in the Collection

♀	Ghor Seisaban, Moab	Canon H. B. Tristram [C & P]	93.11.29.3 (type)
♀	Junction Station, Jerusalem	G. C. Shortridge [C & P]	18.8.1.8
1 ♀, 1	Palestine	Major Maurice Portal [C & P]	44.28–29
2 ♀	Ramleh, 10 miles from Jaffa	,, ,,	19.4.11.1–2
1	Near Jaffa (Maj. A. G. L. Sladen)	Rothschild Bequest	39.1667
♂	Iraq Well, Wadi Thar, 17° 40′ N. 44° E.	H. St. J. Philby [C & P]	40.175
♀	Red Sea coast, 15 miles north of Jidda	A. G. Griffin [C & P]	40.176
♀	N.E. Jidda (A. G. Griffin)	H. St. J. Philby [P]	40.177
? ♂ skull	Umm al Qurun, South Arabian desert	,, ,, [C & P]	40.177a

Felis lybica iraki, Cheesman

1920. *Felis ocreata iraki*, Cheesman, Journ. Bomb. Nat. Hist. Soc., 27, p. 9 (Koweit, North-east Arabia, on the Persian Gulf).

Geographical Distribution.—Only known from the type-locality and from Sheik Saad, on the Tigris, Iraq.

Diagnosis.—Distinguished principally from *F. l. tristrami* by its more uniformly tawny hue above, by the undifferentiated spinal band, and whiter face and feet.

Colour.—The type and only available specimen, a young adult ♂ (20.1.19.2), killed on May 13, has the coat full and longish, the hairs on the flanks being 40 mm., on the crest 45 mm., the difference between the two being very slight, as in some skins of *tristrami*; the general colour above is more sandy than in the latter, and more obscurely speckled; there is no differentiated dark spinal band, the whole of the back being uniformly tinted and blending with the flanks; the backs of the ears are a little brighter and paler than in pale-cared skins of *tristrami*; the face is whiter than in that race, the area between the eyes being almost all white, the summit of the muzzle pale buff, with a rusty streak on each side running from the eye to the nose; there is no perceptible dorsal pattern, that on the flanks consists of very pale brownish patches and the spots below are only just traceable; on the lower side the chin and fore throat are white, the hind throat buff, with no collar, the chest whitish, the abdomen buffy white; the legs are white inside, whitish on the paws in front, and the black on the back of the hind foot is restricted to the lower part.

No flesh measurements were taken.

The undeveloped skull of the type, a youngish ♂, would probably have reached approximately the size of the adult ♂ skull of *F. l. tristrami* from Wadi Thar. Its temporal ridges are 17 mm. apart at the suture and the sagittal crest is only about 1 mm. high; the nasals are steeply sloped owing to the inflation of the anterior ends of the frontals with air-cells, a feature which would probably have been accentuated with increased age. The dimensions are entered on the table (p. 116).

Specimen in the Collection

♂	Koweit, Persian Gulf (Capt. W. H. Shakespeare)	Bombay Nat. Hist. Soc. [P]	20.1.19.2 (type)

Felis lybica ornata, Gray

183 . *Felis ornata*, Gray, Hardwicke's Illustr. Ind. Zool., 1, pl. 2 (India); *id.* Proc. Zool. Soc., 1867, p. 401; Blyth, Cat. Mamm. Mus. As. Soc., p. 63, 1863; Elliot, Mon. Felidae, pl. 32, 1883; Blanford, Mamm. Brit. Ind., p. 84, 1888; and of subsequent authors on Indian Mammals to 1939.

1834. *Felis servalina*, Jardine, Nat. Libr., Felinae, p. 232 (*F. ornata* on pl. 25) (India).

1863. *Felis torquata*, Blyth, Proc. Zool. Soc., p. 185 (in part); Jerdon, Mamm. Ind., p. 110, 1867 (in part) (not *F. torquata*, Cuv.).

1939. *Felis constantina ornata*, Pocock, Mamm. Brit. Ind., 1, p. 287; and 11, p. 479, 1941.

Geographical Distribution.—The drier desert, semi-desert, or scrub country of Western and of Central India south of the Ganges, its extension to the west of Sind unknown.

Diagnosis.—A desert cat resembling *F. l. lybica* and *F. l. iraki* in the greyish sandy ground colour of the upper side, but typically distinguishable at a glance from all the previously described races by its pattern, which consists mainly of strongly emphasised black or brown, irregularly arranged spots. But the pattern varies a good deal individually in distinctness and is sometimes quite faint; on the head, nape, shoulders and loins the spots commonly run into longitudinal streaks and on the fore part of the flanks they often show a vertical arrangement and sometimes coalesce to form the vertical stripes, characteristic of this and other species of *Felis*; on the thighs and fore legs also the spots often run into transverse stripes. The spotted pattern, moreover, is foreshadowed in some skins of *F. l. tristrami*, as pointed out above (p. 117). The spinal area is not so sharply contrasted by its darker colour and elongated hairs, as in most African races, but in these respects it resembles that of *F. l. iraki*; the black on the back of the hind foot may be restricted to its lower part in adult specimens, as in *F. l. tristrami*, and the tail has from three to six stripes in front of its black tip; the ears are pencilled and may match or differ slightly from the head in colour; the wool of the upper side is buff, the upper lip, chin and fore throat are white, the hind throat buff; the chest and belly buff, overcast with white to a varying extent and marked with blackish spots, and there is an ochreous tint on the backs of the thighs and round the genital area.

There does not appear to be a single external character in which this Indian wild cat does not intergrade with the other races of *F. lybica*, and its skull and teeth are the same.

Colour.—There is a large number of skins in the British Museum from widely separated localities in the extensive area occupied by this desert cat. They attest considerable variation in general tint and distinctness of pattern in individuals from the same locality taken at the same season of the year, mostly winter, and in one case seasonal change in a summer skin; also close resemblance between skins from remote localities. They supply no adequate data for the admission of more than one race.

A young adult ♂ (25.10.3.1) from the Salt Range, 1,100 ft., North West Punjab, February 21, has the coat full and soft, about 32 mm. long on the flank and 37 mm. on the spine; the ground colour above is relatively rich greyish buff, darker and greyer on the spinal area, the wool on the flanks being rich buff, on the spinal area nearly ochreous; the pattern is strong and black from the head backwards, the spots on the sides behind the shoulders in front forming incipient or complete vertical stripes; the ears are brownish grey, a little darker than the head, the patches between the eyes, the upper lip and chin are white, the cheeks soiled white and the nose rusty ochreous; the throat is buff and the belly buff, diluted by the white tips of the hairs and with the spots black; the genital area and the backs of the thighs are ochreous; the hind foot is black to the hock and the tail has three complete rings.

A young adult ♂ from Sehore (10.12.2.15), 1,600 ft., in Bhopal, Central

India, some 700 miles south-east of the Salt Range, March 19, closely matches the last in colour and pattern, but is not quite so buff above and has the coat shorter and thinner, only 22 and 25 mm. long on the flanks and spinal area respectively.

Five skins (85.8.1.21–5) from Sambhar, Rajputana, December to February, are not quite so buffy as the last, perhaps owing to fading from longer preservation, varying above from pale buffy or sandy grey to pale, but not silvery, grey, at most a little darker on the spinal area; the pattern above may be practically as well pronounced as in the preceding two, but in some skins the spots are browner and, as a rule, the streaks are weaker on the nape than on the head and shoulders; the ears nearly match the head, but are sometimes a little brighter. On the under side the chin and fore throat are white, the hind throat buff, the chest between the legs whitish or white, the hind chest and abdomen buff diluted to a greater or less extent by the white tips of the hairs, with black spots, the inner sides of the thighs white, turning to pale ochreous behind and above the genitalia, the tail commonly has as many as six rings and the backs of the hind feet may be black throughout or only low down even in adult ♂♂. The coat is about as luxuriant and long as in the Salt Range skin.

A skin from Kishunghar, in Rajputana (85.8.1.26), December 28, has the pattern nearly obsolete, as in many skins of the African races.

Many specimens (43.107–115) from Sind, collected by Frost at Umarkot and Chachro, in Thar Parkar, in December, vary like the series from Sambhar. The early winter coat is thick and soft, with the hairs of the flanks and crest about 30 and 36 mm. respectively. The general colour above varies from sandy to clear stone-grey, the best tinted skins having the ends of the contour hairs buff, with the wool rich ochreous buff, whereas in the paler skins the tips are bleached to nearly grey, with the wool paler buff; the ears closely match the crown and have the tips sometimes darkened; the body pattern varies in distinctness, being on the whole better defined in the grey than in the buffy skins.

A ♂ skin (12.1.9.6) from Islamkot, Thar Parkar, October 7, is interesting from having a decided ochreous wash on the ears. In general colour and pattern it fits in with the greyer of the preceding specimens, but has the coat less full and a trifle shorter, only 27 and 35 mm. In a ♀ (12.1.9.7) from Chachro, November 1, the coat, despite the later date, is still shorter, about 22 and 30 mm.

An adult ♂ skin (15.11.1.69) from Gambat, Khairpur, April 17, and an adult ♀ (15.11.1.69a) from Jacobabad, February 24, match each other very closely in colour and pattern. The colour is duller than in the bright skins from Thar Parkar, and the pattern is browner, being diluted with pale speckling; the bands of the legs are more faded in the Khairpur than in the Jacobabad skin. These are probably seasonal differences.

The only summer skin is the one from Cutch (12.6.27.14), collected in July. The coat is thin and short, only 25 and 30 mm. long; the general colour above is dull sandy drab, neither buff nor grey, and the pattern on the flanks is greyish brown, but on the back, nape and shoulders it forms blackish streaks,

MEASUREMENTS

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
			in.	in.	in.	in.
♂ ad.	Khairpur, Sind . .	15.11.1.69	23½	12⅛	5	2⅜
♂ ad.	Sambhar, Rajputana . .	85.8.1.23	22	10	4½	2
♂ ad.	,, ,, . .	85.8.1.22	19	10½	5	2⅜
♂ ad.	,, ,, . .	85.8.1.25	18½	10½	5	2⅜
♂ ad.	Rhoda Matha, Cutch .	12.6.27.14	19⅜	11	4⅝	2⅜
♂ yg. ad.	Sehore, Central India .	10.12.2.15	18⅝	11⅜	5	2⅜
♂ yg. ad.	[1]Rohtas, Punjab . .	25.10.3.1	(18)	10⅜	5⅜	2⅜
♂ yg. ad.	Islamkot, Sind . . .	12.1.9.6	17⅛	10⅝	5⅜	2⅛
♀ ad.	Jacobabad, Sind . .	15.11.1.69a	22½	11⅜	4½	2⅜
♀ ad.	Sambhar, Rajputana . .	85.8.1.21	18	10	4½	2⅛
♀ yg. ad.	Kishunghar, ,, . .	85.8.1.26	17½	10¼	—	2¼

is strong on the legs and tail, but, unlike the other skins, is faint and grey-brown below.

The weights of the ♂♂ from Cutch and the Salt Range were respectively 7½ and 7 lb.

A point of interest in this table is the apparently large size of the ♀ from Jacobabad, which exceeds all the adult ♂♂ except the one from Khairpur measured by the same collector. The genitalia show that both skins were correctly sexed. The ♀ is considerably larger than the adult ♂ from Cutch, and still more so than the young adult ♂ from Rohtas in the Salt Range, but its skull is noticeably smaller than in either. The combined head and body are no less than 5 inches longer than in the young adult ♂ from Islamkot, Thar Parkar, but their skulls are nearly the same length. There are other discrepancies between the flesh measurements and skull measurements. The adult ♂ from Khairpur is several inches longer in the head and body than the adult ♂ from Cutch, but the latter has a decidedly larger skull.

SKULL.—The skull has exactly the same shape as in the previously described races of *F. lybica*, and is about the same size as in the race from Palestine, and in most of those from the northern districts of Africa. The condylobasal length in seven adult ♂♂ varies from 87 to 91 mm., with an average of just under 89 mm.; and the same dimension in five adult ♀♀ varies from 77 to 83 mm., with an average of about 79 mm. The teeth are almost the same size in the two sexes, those of the ♀ being very slightly smaller on the average.

In the oldest ♂ skull from Chachro, Thar Parkar (43.135), with the narrowest postorbital area, the temporal ridges are 5 mm. apart at the suture, but the short sagittal crest is only 3 mm. high, the occipital crest moderately prominent,

[1] The head and body in this specimen are entered as 360 mm., about 14 inches; but the tail, foot, and ear are of about normal length and the condylobasal length of the skull is very nearly the same as in the skull from Sambhar (85.8.1.25). Hence, there is probably very little doubt that 360 was a mistake for 460 mm., about 18 inches. This dimension has been adopted and bracketed.

Skull Measurements of *Felis lybica ornata*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	pm^4	m_1
			mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Rhoda Motha, Cutch	12.6.27.14	(98)	91	72	—	34	18	25	22 : 16	66	11	$9\frac{1}{2}$
♂ ad.	Sambhar, Rajputana	85.8.1.23	97	90	67	43	32	17	25	19 : $13\frac{1}{2}$	63	11	8
♂ ad.	,, ,,	85.8.1.25	97	88	70	42	31	17	24	20 : 15	65	11	8
♂ ad.	,, ,,	85.8.1.22	—	85	67	44	33	18	22	—	61	11	8
♂ ad.	Salt Range, Punjab	1173a	96	89	67	42	29	17	25	20 : 15	64	11	8
♂ yg.ad.	Rohtas, Salt Range	25.10.3.1	95	89	65	45	33	16	23	21 : 15	64	$11\frac{1}{2}$	9
♂ ad.	Gambat, Sind	15.11.1.69	93	87	67	42	31	18	22	21 : 15	63	$10\frac{1}{2}$	8
♂ ad.	Chachro, Thar Parkar District	43.135	94	87	68	43	28	17	22	20 : 16	64	11	8
♂ yg.ad.	Thar Parkar District, Sind	43.116	91	84	62	43	31	$14\frac{1}{2}$	21	20 : 14	59	11	8
♂ yg.ad.	Thar Parkar District, Sind	12.1.9.6	89	83	66	44	33	16	22	20 : 13	60	$10\frac{1}{2}$	8
♂ yg.ad.	Sehore, Centr. India	10.12.2.15	89	82	65	44	33	17	22	18 : 14	59	11	8
♀ ad.	Jacobabad, Sind	15.11.1.69a	88	83	62	40	30	16	21	20 : 14	59	10	8
♀ ad.	Umarkot, Sind	43.122	87	81	62	44	32	15	20	20 : 16	58	11	8
♀ ad.	Thar Parkar District	43.118	85	78	58	41	30	15	21	19 : 15	54	10	8
♀ ad.	,, ,, ,,	43.121	81	75	56	41	32	15	19	18 : 13	53	11	9
♀ ad.	Sambhar, Rajputana	85.8.1.21	84	78	60	40	31	15	20	19 : 15	57	10	7
♀ yg.ad.	Kishunghar, ,,	85.8.1.26	82	77	57	44	31	15	20	18 : 14	53	10	8

and the postorbital processes on each side almost meet. The skull from Sambhar (85.8.1.25) is similar in the last-mentioned particular, but in the largest, although younger, skull from Cutch (12.6.27.14) the postorbital processes fuse to form a complete ring on the left side. The upper profile of the skull varies individually in shape with air-cell inflation, particularly of the frontals anteriorly, which affects the slope of the nasals. In the skull from Cutch the slope of the nasals is straight and gently inclined, whereas in the skull from Sambhar, the slope is sinuous, the posterior half of the nasals being convex and down bent. A similar difference occurs in the two ♀ skulls from Rajputana.

Specimens in the Collection

1	India	Sir Walter Elliot	109a
1	Nusserabad, Rajputana (Capt. W. J. E. Boys)	Purchased	48.8.14.3 (type)
Mtd.	North-west Provinces	Rothschild Bequest	39.3659
♂	Salt Range, Punjab	Prof. T. Oldham [P]	1173a
♂	Rohtas, Salt Range, 1,100 ft. (H. W. Wells)	Bombay Nat. Hist. Soc. [P]	25.10.3.1
4 ♂, 1 ♀	Sambhar, Rajputana (R. M. Adam)	A. O. Hume [P]	85.8.1.21–25
♀	Kishunghar, ,, ,,	,, ,,	85.8.1.26
♂	Sehore, Bhopal, 1,600 ft.	Capt. C. T. Whitehead [C & P]	10.12.2.15
♂	Rhoda Motha, Cutch (C. A. Crump)	Bombay Nat. Hist. Soc. [P]	12.6.27.14
♂	Gambat, Khairpur, Sind (S. H. Prater)	,, ,,	15.11.1.69
♀	Jacobabad, Upper Sind (S. H. Prater)	,, ,,	15.11.1.69a
♂	Islamkot, Thar Parkar Dist., Sind	E. Priestley [C & P]	12.1.9.6
♀	Chachro, Thar Parkar Dist., Sind	,, ,,	12.1.9.7
9	Thar Parkar Dist. (W. J. C. Frost)	Sir J. Ellerman [P]	43.107–115
8 skulls	Thar Parkar Dist. (W. J. C. Frost)	,, ,,	43.116–120, 135 a and b, 234
2 skulls	Umarkot, Thar Parkar (W. J. C. Frost)	,, ,,	43.121–122
2 skulls	Chachro, Thar Parkar (W. J. C. Frost)	,, ,,	43.134–135

Felis lybica nesterovi, Birula

1916. *Felis ornata nesterovi*, Birula, Ann. Mus. Zool. St. Petersb., 21, Suppl. pp. 1–11 (Lower Mesopotamia); Ognev, Mamm. U.S.S.R., etc., 3, pp. 141 and 695, 1935.

Felis ocreata (error for *constantina*) *nesterovi*, Pocock, Mamm. Brit. India, 1, p. 288, 1939.

Geographical Distribution.—Mesopotamia and South Persia, limits unknown.

Diagnosis.—About the same size as *F. lybica ornata*, smaller, if anything, from the scanty evidence, but provisionally distinguished by its apparently longer coat, judging from a single skin in summer coat in which the flank hairs are about 37 and the spinal hairs about 46 mm. long, decidedly longer than the winter coat of the Indian race.

The account of the summer coat given above is taken from the skin of an adult ♀ shot by Sir J. E. B. Hotson at Persepolis, South Persia, on June 29, and provisionally assigned to this race. The contour hairs are long and rather harsh and the under wool is scanty; the general colour, seasonally bleached, is whitish grey, darker on the back, where patches of buff are exposed when the hairs are parted, and the pattern consists of the normal stripes on the tail and limbs, faint streaks on the shoulders and obscure spots elsewhere; the backs of the ears are faded ochreous.

A well-grown kitten, killed with the [illegible]s strikingly different. The coat is full and soft, about 20 mm. long, the colour above is buff, gradually fading on the flanks, the pattern is black and strongly pronounced, and the ears are brownish ochreous, turning nearly black at the tips.

Measurements.—Adult ♀, head and body, 19$\frac{1}{2}$; tail, 12; hind foot, 5; ear, 2$\frac{3}{5}$. Young ♀, head and body, 11$\frac{1}{2}$; tail, 7; hind foot, 3; ear, —.

The dimensions of the adult agree very closely with those of the Indian race entered in my volume above cited; but Ognev gave the cranial measurements of a presumably adult ♂ which had the condylobasal length only 81 mm. In four adult ♂♂ of *ornata* that dimension ranges from 91 to 82 mm., the average being 88 mm.

Specimens in the Collection

2 [illegible]jv. Persepolis, S. Persia Sir J. E. B. Hotson [C & P] 25.10.4.11–12

Felis lybica caudata, Gray

1841. *Felis servalina*, Brandt, Bull. Acad. Sci. St. Petersb., 9, p. 34 (not *F. servalina*, Jardine, 1834).
1874. *Chaus caudatus*, Gray, Proc. Zool. Soc., p. 31, pls. 6, 7 (Kokand).
1889. *Felis* (*Chaus*) *caudata*, Radde and Walter, Zool. Jahrb., 4, p. 1014.
1912. *Felis caudata*, Birula, Ann. Mus. Zool. St. Petersb., 17, p. 226; Satunin, Consp. Mamm. Imp. Russ., p. 165, 1914.
1914. ?*Felis caudata schnitnikowi*, Birula, Annu. Mus. Zool. Akad. St. Petersb., 19, p. 1 (Semiryechensk).
1914. *Felis grisco-flava*, Zukowsky, Arch. Naturg., 9, p. 95 (near Lake Balkash).
1930. ?*Felis longipilis*, preoccupied, replaced by *macrothrix*, Zukowsky, 1914; Ognev, Zeitschr. Säuget., V, p. 64.
1930. *Felis ornata caudata*, Ognev, Zeitschr. Säugetierk, 5, p. 61; and Mamm. U.S.S.R., 3, p. 132, 1935.
1939. *Felis constantina caudata*, Pocock, Mamm. Brit. India, 1, p. 288.

Note on Type Localities.—Locality of the type of *caudata*, according to Gray, Cocan or Khokand, in Ferghana, but, probably correctly, according to Birula and Ognev, the Djany (Dyanan)-Daria, a tributary of the Syr-Daria, in the western Lake Aral district of Turkestan. It is believed to have been collected by Severtzow.

Geographical Distribution.—The Steppes of Turkestan as far east as the Thian Shan and southwards into Persia and Afghanistan.

Diagnosis.—Distinguished from *F. l. ornata* at least by its more luxuriant winter coat and larger size, judging from the skull, which is longer on the average sex for sex, and has rather larger teeth.

Although the skins in the British Museum come from widely separated districts in Turkestan, from northern Persia and north-western Afghanistan, I am unable to distinguish them subspecifically. No two are exactly alike, they vary noticeably in the same locality in colour and pattern, and skins from widely separated areas are often more alike than from the same area.

Colour.—The ground colour of the upper side varies from pale sandy or buffy in the unfaded coat to clearer whitish grey when the coat is seasonally faded, the two tints being sometimes observable on the same skin when the coat is changing. The pattern of the upper side may consist practically entirely of isolated spots showing very little tendency to fuse as stripes or the spots may run into definite streaks on the crown, nape and shoulders, and into two or three very distinct vertical stripes on the sides of the body in front, considerable variation being observable in skins from the same locality. The ears may be nearly the same tint as the crown, but are usually more ochreous brown; there is always an apical tuft.

The type, an adult ♀, has a luxuriant winter coat, the hairs being about 55 mm. on the spinal area and 45 mm. on the flank; the general colour is pale grey above, a little darker dorsally than laterally, the contour hairs being distinctly white, with a small black tip; the wool is purplish grey at the base, ochreous buffy above, richer dorsally than laterally, and the tint may be exposed in patches when the coat is parted; the pattern is not very conspicuous on the body, the spots being rather small and fuscous; the ears are about the same tint as the crown and the terminal tuft is 15 mm. long.

This skin, which was exhibited as a mounted specimen, is probably a little faded. The coloured plate is not the least like it, the general hue being slate grey, the pattern much too strongly emphasised and the paws too ochreous.

Two ♀ skins from Djarkent, in Semiryechensk, topotypes apparently of *schnitnikowi*, differ a good deal. One (14.5.10.59), October 28, in fresh but not full winter coat, has the spinal hairs 45 mm. and the flank hairs 35 mm. The general colour is sandy, but on the back behind the shoulders a large patch of the summer coat is retained and is much clearer grey without appreciable under-wool. The pattern consists mostly of spots, but on the flanks of the right side they run into a few stripes. The other skin (14.5.10.58), December 20, has the winter coat about as luxuriant as in the last; the general colour is not so sandy, the contour hairs being subapically more bleached, but the tint is slightly darker owing to the hair-tips being more pigmented. The pattern also differs,

there being much more black pigment on the hinder half of the spinal area, the spots are definitely larger and more scattered, and the stripes on the crown, nape, shoulders and flanks are exceptionally well defined. The ear also is much darker ochreous brown.

Two unmeasured, undated adult ♂ skins, without skulls, are from Meshed, North Persia (Sir P. M. Sykes). One (13.6.10.2) has the coat tolerably long and luxuriant, the hairs on the spine being about 45 mm. and on the flank 38 mm. long. The general colour of the upper side is buffy grey, exactly matching that of the darker skin from Djarkent; but the pattern is more spotty, less lineate on the nape and shoulder, and without such definitely vertical stripes on the fore flank. The other (13.6.10.3) has the coat a little less luxuriant, the spinal hairs being about 40 mm. and the flank hairs about 35 mm.; the general colour above is noticeably greyer, but the throat is more buffy. This skin closely matches the type in the colour of the upper side, but the spots are a little larger and blacker.

A specimen of doubtful identification is represented by the skin and skull of an old ♀ (23.9.16.1), labelled "Siberia". It was imported alive by Carl Hagenbeck and bought by Sir Claud Alexander, who kept it in captivity for many years and finally presented it to the Museum. Although it died in the middle of July, it was still carrying a luxuriant winter coat about 50 mm. long. The colour is of the grey type; the stripes on the nape and top of the shoulders are strong and on the rest of the body the spots are large and scattered very much as in the darker of the two skins from Djarkent, but the lateral stripes are not nearly so much in evidence. The flesh measurements, given below, show slight superiority over those of the Djarkent specimen.

An imperfect, undated, unsexed and unmeasured skin without skull from Bala Murghab, in Afghanistan (86.10.15.2), closely resembles the darker of the two skins from Djarkent in colour; but the summit of the wool is richer ochreous than in any of the previously described skins.

MEASUREMENTS

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
			in.	in.	in.	in.
♀ ad.	Djarkent . . .	14.5.10.58	20$\frac{4}{8}$	11$\frac{1}{8}$	4$\frac{3}{8}$	2+
♀ yg. ad.	,, . . .	14.5.10.59	19$\frac{4}{8}$	11$\frac{4}{8}$	4$\frac{5}{8}$	2$\frac{1}{8}$
♀ ad.	"Siberia" . . .	23.9.16.1	21$\frac{2}{8}$	12$\frac{1}{8}$	5	2$\frac{4}{8}$

SKULL.—The skull of a fully adult ♂ (20.7.4.4), without skin, and with no nearer locality than Transcaspia, is only moderately well moulded, the temporal ridges being 9 mm. apart at the suture, but the sagittal crest only 2 mm.; the slope of the anterior half of the nasals is moderately steep owing to air-cell inflation of the area just behind; with a condylobasal length of 96 mm., it is a little bigger than the biggest skull of *ornata* and has slightly bigger teeth; but

SKULL MEASUREMENTS OF *FELIS LYBICA CAUDATA, FELIS LYBICA* SUBSP. AND *FELIS LYBICA NESTEROVI*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Mand. length*	pm^4	m_1
	F. l. caudata		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Transcaspia . .	(*vide* Ognev)	112·3	103·2	82·3	47	33·8	23·3	29·6	24 + : 17	—	12·2	10·2
♂ ad.	,, . .	,,	106·5	99	75	46	34	20	27·3	24·5 : 16	—	12	9·2
♂ ?	,, . .	,,	93·5	—	68	42·3	36	19	25	21·3 : 15·7	—	12·2	9·8
♂ ad.	,, . .	20.7.4.4	104	96	75	47	33	21	26	23 : 16	70	12	10
♀ ad.	Djarkent . .	14.5.10.58	94	85	65	44	34	17	24	19 : 14	63	12	9
♀ yg. ad.	,, . .	14.5.10.59	—	—	61	45	35	15	22	—	—	12	9
♀ ad.	Transcaspia . .	(*vide* Ognev)	90·3	—	66	42·2	33·2	18·6	25	21·3 : 16	—	12·5	10
♀ ad.	Khokand . .	73.7.22.1	90	84	66	46	36	18	23	20 : 14	—	11	—
	F. l. subsp. .												
♀ old	Siberia? . . .	23.9.16.1	103	92	75	46	34	21	27	21 : 15	68	—	9
	F. l. nesterovi												
	Lower Mesopotamia	(*vide* Ognev)	88·3	81	63	40	32·8	18·5	22	21 : 15	—	10·5	8

it is considerably shorter than the longest skull recorded by Ognev, in which that dimension is over 103 mm. This author, however, recorded as that of an adult ♂ a skull with a total length of 93½ mm., which is less than the total length in most of our skulls of *ornata*. But the wide postorbital area in that skull betrays it as either an undeveloped ♂ or a ♀ skull. I suspect the latter. An adult ♀ skull (14.5.10.58) from Djarkent with a condylobasal length of 85 mm. is only a trifle longer than the adult ♀ of *ornata* from Jacobabad, but has larger teeth. It is not so old as the skull from Transcaspia, and has the temporal ridges 17 mm. apart at the suture, the sagittal crest lower, the occipital crest less salient, and there is no appreciable inflation of the anterior part of the frontals, so that the slope of the nasals is less abrupt.

The skull of the type (73.7.22.1) is adult, but younger than the Djarkent skull, as shown by its wider postorbital area, with the temporal crests 25 mm. apart, and the less salient occipital crest. The slope of its nasals are as in the ♂. The canine teeth in these two ♀♀ are 4 mm. thick at the base; in the ♂ skull they are 5 mm.

The skull of the skin labelled Siberia (23.9.16.1) is that of a very old ♀ with the teeth broken and worn; the temporal ridges are very strong, but 17 mm. apart at the suture; the sagittal crest is 4 mm. high and the occipital crest is as prominent as in the ♂ skull. Since it is a good deal bigger than the other ♀ skulls described above, and than those recorded by Ognev, it may represent a cat of a different race, but since it has no precise locality and was many years in captivity, it would be premature to name it.

Specimens in the Collection

	Khokand, Fergana? (probably from the Djany-Daria, tributary of Syr-Daria, Turkestan, and collected by Severtzow)		73.7.22.1 type
♂ skull	Transcaspia (Dr. E. Pfizenmayer)	Purchased	20.7.4.4
2 ♀	Djarkent	Hon. N. C. Rothschild [P]	14.5.10.58–9
2 ♂	Meshed, North-east Persia	Sir P. M. Sykes [C & P]	13.6.10.2–3
1	Bala Mergbab, North-west Afghanistan (Dr. J. E. T. Aitchison)	Afghan Boundary Commission [P]	86.10.15.2
♀	Siberia (imported alive by Hagenbeck)	Sir Claud Alexander [P]	23.9.16 1

Note.—For the descriptions and the skull measurements of the following Asiatic races related to typical *F. lybica caudata* and established by Zukowsky and Ognev, I am indebted to the information supplied by the latter in his two works cited. Considering the widely separated localities from which the skins described above as *caudata* came, it seems probable that some of them may represent some of the alleged races entered below, but the differences between those skins all appear to me to fall within the limits of individual variation. The differences between the two skins from Djarkent in the black pigmentation

of the spinal area, the size and distribution of the spots, the distinctness of the stripes on the crown, nape and shoulders, and the colour of the backs of the ears are characters used to distinguish some of the following races from each other.

Felis lybica murgabensis, Zukowsky

1914. *Felis murgabensis*, Zukowsky, Arch. Naturg., 1, p. 127 (Tachta-Basar (Pendshe), Transcaspia).
1930. *Felis ornata murgabensis*, Ognev, Zeitschr. Säugetierk, 5, p. 65; and Mamm. of U.S.S.R., 3, p. 143, 1935.

Geographical Distribution.—The Murghab Steppes of Transcaspia.

Diagnosis.—Said to be very like the steppe-cat of Syr Daria. Ognev identified it as *caudata*, but differing in having the spots smaller and more widely separated; the general colour of the summer coat is buffy whitish grey with a mixture of a cream yellow straw tint, of the winter coat yellowish red straw tint. Ognev's measurements supply no evidence that the skull differs from that of typical *caudata*.

No specimens in the Collection.

Felis lybica matschiei, Zukowsky

1914. *Felis matschiei*, Zukowsky, Arch. Naturg., 10, p. 130 (110 kilometres south of Geok-Tepe, near Persian border).
1930. *Felis ornata matschiei*, Ognev, Zeitschr. Säugetierk, 5, p. 67; and Mamm. of U.S.S.R., 3, p. 146, 1935.

Geographical Distribution.—Probably the south-west corner of Turkmenistan and the mountains of Kopet-Dag.

Diagnosis.—Declared by Ognev to differ from typical *caudata* by the markedly darkened and blackened central region of the back, by having hardly any spots on the body, none on the head, and no stripes on the legs.

Skull.—The skull and teeth seem to resemble those of *murgabensis* and typical *caudata* in size.

No specimens in the Collection.

Felis lybica, subspecies

1876. *Felis shawiana*, Blanford, Journ. As. Soc. Beng., 45, pt. 2, p. 49 and p. 17, pl. 1 *b*, 1879 (in part; skins only) (Yarkand Bazaar); Elliot, Mon. Felidae, pl. 35, 1883.
1930. *Felis ornata shawiana*, Ognev, Zeitschr. Säugetierk, 5, p. 66, and Mamm. U.S.S.R., 3, p. 144, 1935 (not *shawiana*, Blanford, *sensu stricto*).

Geographical Distribution.—Eastern Turkestan from Kashgar and Yarkand to Hami Kum-Taga and the whole of the basin of the River Tarim (Ognev).

Diagnosis.—Distinguished according to Ognev, from *caudata* by the

somewhat paler and purer drab rusty-yellow colour of the winter coat, by the usually pale, dull grey basal part of the under fur, by its relatively small, widely separated blackish spots, and by its very short tail, marked with from six to eight rings. The summer coat is thinner, coarse, duller and whiter than the winter coat, the spots are less distinct and the lower side is dirty white, with a rusty shade. Ognev also states that this race is undoubtedly closely allied to *murgabensis*, but differs by its shorter tail and generally rustier colouring.

Remarks.—It must be pointed out, however, that in 1891, W. L. Sclater (*Cat. Mamm. Ind. Mus.*, pl. 2, p. 227), who had Blanford's specimens to examine, stated that the skins were bought in the bazaars at Yarkand and Kashgar, and that the shortness of the tails mentioned by Blanford seemed to be due to mutilation. This opinion I confirmed later (*Mamm. Brit. Ind.*, 1, p. 290, 1939) from an examination of Blanford's two skins, which I determined as belonging to immature examples of *F. constantina* (=*lybica*) *caudata*. At the same time I detected that the skull Blanford assigned to one of these skins is clearly the skull of *F. chaus* and could not belong to either of the skins; and since this skull was marked as the type of *shawiana*, that name was relegated to the synonymy of *F. chaus*.[1] I may have been wrong about the precise determination of the skins, but on the available evidence did not feel justified in regarding them as representing a new race.

According to Ognev's measurements the skull is about the same size as that of typical *caudata*.

No specimens in the Collection.

Felis lybica issikulensis, Ognev

1930. *Felis ornata issikulensis*, Ognev, Zeitschr. Säugetierk, 5, pt. 1, pp. 67–9, pl. 2, figs. 1–3 (the north-western shore of Lake Issykkul); and Mamm. U.S.S.R., 3, p. 146, 1935.

Geographical Distribution.—Only known from type locality.

Diagnosis.—Readily distinguished, according to Ognev, from typical *caudata* by its darker winter coat. The general colouring is dirty grey, with a drab shade; the pattern consists of blackish brown spots which on the dorsal area are elongated and tend to run into two or three longitudinal stripes. The backs of the ears dark, greyish-drab brown, turning to blackish brown towards the edges and dark tan at the tips, which carry a small tuft. In other Asiatic races related to *caudata* the backs of the ears are relatively pale grey-drab, sometimes whitish.

Apart from some obvious error in the length of the tail, the dimensions agree very closely, so far as the ♂ is concerned, with those of the ♀ specimens of typical *caudata* entered above. The skull, however, appears to be a little smaller sex for sex.

Remarks. As Ognev pointed out, this race most closely resembles the next, *F. l. koslowi*, its nearest geographical ally, but is distinguished from it principally

[1] See below, p. 151.

Measurements

Sex	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
	in.	in.	in.	in.
♂	21 4/5	11 4/5	5 2/5	2 2/5
♀	20 2/5	(?) 8 4/5	4 2/5	2 3/5

by its normally striped neck, rather differently coloured ears, the absence of the spinal band and of the posterior collar on the throat, and by the incompleteness of the anterior collar. The skulls of the two are approximately the same size.

No specimens in the Collection.

Felis lybica koslowi, Satunin

1904. *Felis* (*Felis*) *koslowi*, Satunin, Priroda i Ochota, p. 10 (Oasis of Ljuktschun, Turfan-Thalkessel, East Tian-Shan).

1904. *Felis* (*Felis*) *koslovi*, Satunin, Ann. Mus. Zool. St. Petersb., 9, p. 533 (of separate p. 10) (1905); Ognev, Zeitschr. Säugetierk, 5, p. 69, 1930, and Mamm. U.S.S.R., etc., 3, p. 148, 1935.

Geographical Distribution.—Known only from the typical locality.

Diagnosis.—Distinguished from *caudata* by its generally darker colour, particularly of special areas of the upper side. The head above is brownish, closely speckled with yellowish white, and the middle of the crown and nape are so thickly spotted and striped as to be almost black, four black stripes being traceable on the neck; the ears are blackish brown with a reddish cast, the tip being black and pencilled; the ground colour of the flanks is grey, intermixed here and there with reddish yellow (? when the coat is parted displaying the wool), and down the back from between the shoulders to the upper side of the tail runs a reddish brown band thickly pigmented with black spots; the pattern consists of vertical stripes, some complete, some broken up, extending from the dorsal band to the lower side of the body, with spots between; the lower side is mostly yellowish white, with reddish yellow on the genital area and the base of the tail below, and there are two collars on the white throat, the posterior being blackish brown, the anterior reddish brown; the tail has six rings in front of the black tip.

Measurements.—The measurements of the flat skin in English inches are: head and body, 23 3/5; tail, 9 3/5. Judging from the length of the tail, which was complete, the head and body were obviously greatly stretched. The dimensions suggest a small cat.

Skull.—The skull, which from its constricted postorbital area was probably that of an old ♂, is smaller than those of *caudata*. Satunin unfortunately gave no measurements of the teeth or auditory bullae.

SKULL MEASUREMENTS OF SOME ADDITIONAL ALLEGED RACES RELATED TO *FELIS LYBICA CAUDATA* FROM TURKESTAN RECORDED BY OGNEV

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	pm^4	m_1
	F. l. murgabensis		mm.	mm.	mm.	mm.	mm.	mm.	mm	mm.	mm.	mm.
♀ ad.	Murghab Steppes, Turkestan . .	(*vide* Ognev)	108·2	100·2	78	47·7	35	21·2	28	25 : 16·3	12	9·5
ad.	Murghab Steppes, Turkestan . .	(*vide* Ognev)	95	88	67	42	33·7	18·6	23·2	21·2 : 14·5	12	9
	F. l. matschuci											
♀ ad.	South of Geok Tepe, Turkestan . .	(*vide* Ognev)	108	97·6	78·2	46	33	20·2	26·2	23 : 16·4	13	10
	F. l. issikulensis											
♂ ad.	Mts. of Djaty-su, Lake Issykkul . .	(*vide* Ognev)	99·2	92·2	69	45·5	—	—	—	23 : ?	—	—
ad.	Mts. of Djaty-su, Lake Issykkul . .	(*vide* Ognev)	86·2	80	64·8	49	—	—	—	19 : ?		–
	F. l. subsp. ? (*shawiana* Ognev)											
♂ ad.	Eastern Turkestan .	(*vide* Ognev)	105	97	75·3	45·3	33	21·6	27	23·3 : 16·5	12·4	10
♀ ad.	,, ,, .	,,	99·2	92·2	69	45·5	33·5	19·8	26	23 : 16·3	10	9
ad.	,, ,, .	,,	86·2	80	64·8	49	31·3	17	22	19 : 13·5	10·2	7·5
	F. l. koslowi											
♂ ad.	Ljuktschun, East Tian-shan . .	(*vide* Ognev)	96	187	67	42	31·5	20	—	—	—	—

Remarks.—There are many features in the description of this cat that suggest it may be a feral domestic cat of the *torquata*-type of pattern. If a genuine wild cat, it is obviously a well-marked form.

No specimens in the Collection.

Felis bieti, Milne Edwards

(Synonymy under subspecies)

Geographical Distribution.—Eastern Asia from Southern Mongolia through Kansu to Szechwan.

Diagnosis.—A desert or semi-desert cat distinguished from *F. lybica* by the great reduction in thickness of the malar excrescence of the zygomatic arch adjoining the infraorbital foramen and almost always by the similar reduction of the inner lobe of pm^4.[1]

Diagnosis.—The only difference in external characters apparently is the considerably greater length of the hair-tuft at the tip of the ear.

Remarks.—In the cranial and dental feature just mentioned it resembles the next species, *F. margarita*, essentially a desert cat, but has the auditory bullae in the skull much less strongly inflated; and in external features it further differs by the presence of the tuft on the ear and by the pads of the feet being unconcealed by hair even in winter, although the extent of the hairy padding is racially variable in *margarita*. *F. bieti* is in a measure intermediate between *F. lybica* and *F. margarita*.

Felis bieti bieti, A. Milne Edwards

1892. *Felis bieti*, A. M. Edwards, Rev. Gén. Sci. Pures et Appliqués, 30, 670 (October) (Tatsienlu, Central Szechwan); *id.* Congr. Internat. Zool. Moscou, 2, p. 256, 1893; Pousargues, Bull. d'Hist. Nat. Paris, 4, p. 357, 1898.

1892. *Felis pallida*, Büchner, Bull. Acad. Sci. St. Petersb. (2), 3, p. 433 (November) (Tatung Range, Kansu); *id.* Mamm. Przewalski, etc., 5, p. 228, pl. 27, 1894; Grevé, Nov. Act. Caes. Leop., p. 63, 1895; Matschie, S.B. Ges. Nat. Fr. Berl., 1908, p. 190; Pocock, Proc. Zool. Soc., B, 108, p. 45, 1938.

1898. *Felis chaus pallida*, de Winton, Ann. Mag. Nat. Hist. (7), p. 291.

1922. *Felis pallida subpallida*, Jacobi, Abh. Mus. Dresden, 16, p. 9 (Sungpan, North-west Szechwan).

1925. *Felis* (*Poliailurus*) *pallida*, Lönnberg, Arkiv f. Zool., 18, A, No. 2, p. 1.

1938. *Felis* (*Poliailurus*) *bieti*, G. M. Allen, Mamm. China and Mongolia, p. 451 (in part).

1943. *Felis bieti bieti*, Pocock, Proc. Zool. Soc., ser. B, 113, pp. 173–5.

[1] As pointed out above (p. 108), this lobe is noticeably reduced in size in some skulls of *F. lybica mellandi*, *cafra*, and *griselda*, the desert cat of south-western Africa; in this cat it is a purely individual variation.

Geographical Distribution.—Szechwan and Kansu.

Diagnosis.—Ears uniformly coloured, matching the back, with the pencil red; the stripes on the cheeks and legs faint and brownish and the backs of the legs not heavily pigmented with black.

The coat is long and thick; the general colour above is yellowish grey, the contour hairs having an extensively whitish subapical area and a small blackish tip; the backs of the ears are uniformly tinted, closely matching the body in colour, and the apical pencil, about 20 mm. long, is red; the genal stripes are indistinct and brownish; the pattern on the body may consist of about a dozen indistinct vertical stripes, with spots on the shoulders and thighs, but the body stripes are sometimes obliterated and the thighs may be indistinctly striped; the hind throat is yellowish brown and the chest and belly whitish.

This account is abridged from the description of *bieti* by Milne Edwards and of *pallida* by Büchner. The type of the latter is distinguished by the absence of the body pattern and the presence of bands on the thighs. In the type of *bieti* the pattern on the body consists of indistinct vertical stripes and on the thighs of spots.

The skins of the alleged race, *subpallida*, were said to be a little darker in tint and more clearly striped on the thighs than those of *pallida*, and the pencil on the ears was 24 mm. long. Since these may be merely individual differences, dependent perhaps on season, I follow Pousargues and G. M. Allen in regarding the specimens assigned to *bieti*, *pallida* and *subpallida* as representing the same subspecies.

The two chief measurements in English inches of the dried skins entered in literature under these three names are as follows:

Sex	*Locality*		*Number*	*Head and Body*	*Tail*
				in.	in.
	Tatsienlu	*F. bieti*	(*vide* Milne Edwards)	28	22
	Central Szechwan	,,	(*vide* Pousargues)	29$\frac{3}{5}$	14
	,, ,,	,,	,, ,,	28$\frac{2}{5}$	14$\frac{1}{5}$
	Sungpan	*F. subpallida*	(*vide* Jacobi)	33$\frac{1}{5}$	14
	,,	,,	,, ,,	33$\frac{3}{5}$	14
	Kweito	*F. pallida*	(*vide* Matschie)	32$\frac{4}{5}$	13$\frac{1}{5}$
	Tatung	,,	(*vide* Büchner)	27$\frac{1}{5}$	13
	,,	,,	,, ,,	31	12$\frac{4}{5}$

Except in Milne Edwards's record the tails are tolerably uniform in length, more so than the heads and bodies, and in all but one skin, are less than half the length of the latter, suggesting that the tail is shorter than in *F. lybica*. But since the head and body in striped skins, when pegged out to dry, are usually more stretched than the tail, that conclusion cannot be regarded as established. M. Edwards gave the length of the tail of his type as 55 cm. (=22 in.), but

since Pousargues, who examined Edwards's specimens, gave their tail lengths as 14 and $14\frac{1}{5}$ inches, it seems evident that 55 was a misprint, likely enough for 35 cm. (=14 in.).

Skull.—The only known skull, from Minshan in Kansu, which Lönnberg identified as *pallida* and made the basis of his subgenus *Poliailurus*, is, judging from the figures, that of a barely adult ♀ and muscularly undeveloped. The weak ridges of its temporal muscles are about 24 mm. apart, the occipital crest is very little developed, there appears to be no trace of the posterior sagittal crest and the postorbital area is wide, only slightly constricted. From the dorsal and ventral views it seems that the anterior, suborbital halves of the zygomatic arches are less everted, less arcuate and salient than in most species of *Felis*, so that the skull is considerably narrower across this area than across the posterior temporal halves of the arches. This feature may be a matter of age, but it recalls the skull of *F. chaus*. The side view shows that the upper surface is tolerably strongly and nearly evenly convex from the occiput to the middle of the nasals, its highest point being between the frontal postorbital processes, where air-cell inflation reaches its maximum. The nasals are barely constricted mesially and rather short, their posterior ends not reaching the level of the upper ends of the maxillae. The bullae are tolerably large, project about 5 mm. below the occipital condyles in profile view, their total length being slightly more than one-fourth the condylobasal length, and as nearly as may be, equal to the combined lengths of pm^2, pm^3 and pm^4; pm^2 being midway between the canine and pm^3, and the width of the basioccipital between the bullae is equal to about half their width. They are clearly considerably smaller than in *F. margarita* described below (p. 139).

Lönnberg's measurements in millimetres of this skull from Minshan were: condylobasal length, 94; zygomatic width, 74·5; cranial width, 51·2; postorbital width, 37·3; interorbital width, 19·5; length and width of bullae, 24·5 and 15·5; pm^4, 12; m_1, 9.

Although the skull is that of a ♀ which had perhaps not quite reached full length, it has the same condylobasal length as the adult ♂ skull of *F. lybica caudata* from Transcaspia, described above. The latter on account of its age and sex has the cranium and postorbital areas narrower, but the bullae are as strongly inflated. Lönnberg's skull is about the same length as the average in ♀♀ of the smaller Indian races of *F. chaus*.

This incompletely developed skull was claimed to differ from that of *chaus*, *ocreata* (=*lybica*) and *silvestris* in the sum of a number of characters, most of which are trivial and can be shown to be individually variable in any large series of skulls of other species of *Felis* (s.s.) and the most impressive, namely, the reduction of the malar thickening outside the infraorbital foramen, associated with the smaller inner lobe of pm^4, has been independently acquired by at least two species of the genus adapted to desert or semi-desert life, e.g. *F. margarita* of Turkestan and the Sahara and *F. nigripes* of South Africa. For these reasons *Poliailurus* is, in my opinion, a synonym of *Felis* as I understand this term.

No specimens in the Collection.

Felis bieti chutuchta, Birula

1917. *Felis chutuchta*, Birula, Annu. Mus. Zool. Acad., St. Petersb., 21, Nouv. et Faites Divers, p. 1 (Province of Goizso, Desert of Gobi, South Mongolia).

1935. *Poliailurus pallida chutuchta*, Ognev, Mamm. of U.S.S.R., etc., 3, p. 173, fig.

1938. *Felis* (*Poliailurus*) *bieti*, G. M. Allen, Mamm. China and Mongolia, p. 451 (in part).[1]

1943. *Felis bieti chutuchta*, Pocock, Proc. Zool. Soc., ser. B, 113, pp. 173 and 175.

Geographical Distribution.—Unknown apart from type locality.

Diagnosis.—Distinguished on the available evidence from typical *bieti* by being redder in hue on the body and ears, more distinctly striped, and by some cranial characters.

Colour.—According to Birula this cat differs from *F. pallida* (=*bieti*) in being redder in colour and more distinctly striped transversely. The back has a longitudinal band tawny fuscous and varied with black; the head is marked with short fuscous lines and three stripes on the cheek; the ears behind are reddish grey and spotted with white at the base and apically pencilled; the lips, chin and throat are white, with a wide, reddish band on the throat; the abdomen is white with black spots; the tail is shortish and coloured like the back, with four or five thin black stripes and a black tip at its distal end. All the apparent differences from *bieti* might be individual, perhaps seasonal.

The measurements in English inches of the dried skin were: head and body, 24; tail 9½; both dimensions being decidedly shorter than the shortest skin of *bieti*.

Not knowing the skull of *pallida* (=*bieti*), Birula declared the skull of *chutuchta* to be like that of *F. caudata*, but with a wider forehead, the "infra-orbital" (interorbital) part strongly convex and the anterior nares wider and less constricted.

Skull.—Birula gave only three measurements of the skull of the type of *chutuchta*, the zygomatic width, which has little significance owing to its age-variation, the total length and what he called the basal length. The last two are irreconcilable. A cat's skull of this kind with an alleged basal length of 89 mm. should have a condylobasal length of about 95 mm., very nearly as long as the total length given by Birula. But Ognev's reduced figure of the skull shows that its total length exceeds the condylobasal length by 4 or 5 mm., which would make the total length about 100 mm. Although this slightly exceeds the total of 97 mm. given by Birula, I provisionally assume as a possible explanation of the difficulty that by "basal" he meant "condylobasal". On this supposition his measurements of the unsexed apparently adult skull will be: total length, 97; condylobasal length, 89; zygomatic width, 70; a little smaller in the last two dimensions than in the ♀ skull of *bieti* from Minshan.

[1] G. M. Allen assigned *chutuchta* to the synonymy of *bieti*, and I accept his view regarding their probable specific identity. Possibly if he had been acquainted with Ognev's figure of the skull of *chutuchta*, he might have held a different opinion.

It is noticeable that there is not a word in Birula's description of the skull to suggest that it exhibited the characters of those of *pallida* on which Lönnberg founded his subgenus *Poliailurus*; but since Ognev gave full generic value to *Poliailurus* and assigned *chutuchta* to it apparently on the evidence supplied by the skull of the type which he had in his hands, it must be inferred that the zygomatic arch at all events has the anterior thickening adjoining the infraorbital foramen greatly reduced. Fortunately, Ognev published a side view photograph

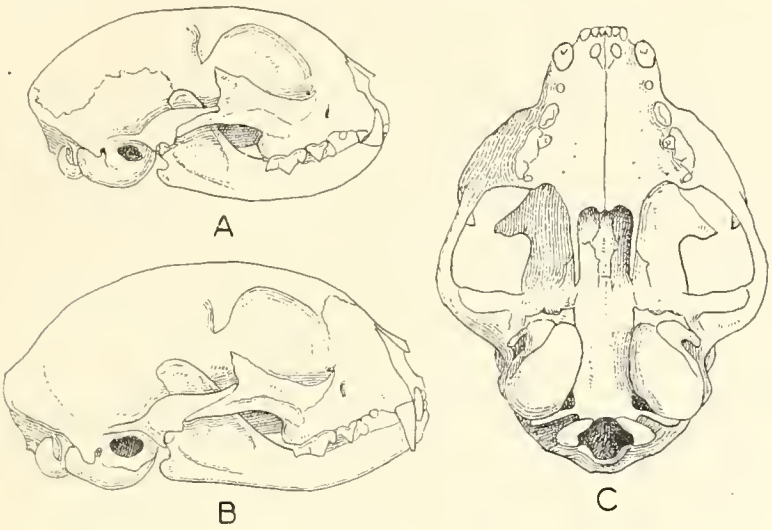

FIG. 5.

A.—Side view of skull of *Felis bieti chutuchta;* traced from Ognev's indifferent photograph of the skull of Birula's type.

B.—Side view of the skull of *Felis bieti bieti;* traced from Lönnberg's photograph of the skull he identified as *Felis pallida*, the type of his subgenus *Poliailurus.*

C.—Lower view of the subadult female skull of *Felis bieti bieti.* Traced from Lönnberg's obscure photograph of the skull he identified as *Felis pallida*, the type of his subgenus *Poliailurus.*

of the skull of Birula's type, and this shows that it differs from that of *pallida* figured by Lönnberg in the shape of the forehead, which is noticeably prominent from inflation with air-cells so that the basal half of the nasals is steeply sloped, and also in the size of the bullae, which are much less inflated in profile view, and hardly project below the occipital condyles, whereas in Lönnberg's skull assigned to *pallida* they project 5 mm. below. Admittedly, these cranial differences may prove to be individual; but taken in conjunction with the alleged external differences between the two cats, it seems advisable to regard *chutuchta*, provisionally at all events, as subspecifically distinct from *bieti.*

No specimens in the Collection.

Felis bieti vellerosa, Pocock

1908. *Felis catus* (*domestica* auct.), Thomas, Proc. Zool. Soc., p. 967.
1943. *Felis bieti vellerosa*, Pocock, Proc. Zool. Soc., ser. 13, 113, p. 172 (near Yu-lin-fu, 4,000 ft., border of Ordos and North-east Shensi).

Geographical Distribution.—Known only from the type locality.

Diagnosis.—Distinguished, apparently, from the preceding two races by the backs of the ears being bi-colour, the lower half grey, the upper half jet-black, with a long black pencil, by the limbs being heavily pigmented with black posteriorly and marked with black stripes, and by the conspicuous black genal stripes.

Colour.—The winter coat[1] is very long and thick, the normal contour hairs being from 85 to 90 mm. long and forming behind the ears, cheeks, and on the throat a prominent lynx-like ruff; the tail is bushy, but the hairs on the face and limbs are comparatively short and the wool of the upper side is massed into a felted carpet at the base of the contour hairs. The general colour of the nape, flanks and outer sides of the shoulders and thighs is dull grey, the hairs being extensively whitish at their tips, but the spinal area behind the shoulders is noticeably darker and browner, the hairs being largely black and buff; the pattern is obliterated on the flanks, but there is a conspicuous blackish grey patch on the lower flank just above and behind the fore leg and the lower part of the thigh is similarly tinted; the crown is blackish grey, thickly speckled with whitish and indefinitely spotted or lined with black pattern; the genal stripes are black and conspicuous on the pale grey ground; there is some whitish above the eye, a blackish patch in front of it; the muzzle and upper lips are reddish buff, the chin and fore throat white and the backs of the ears are dark grey at the base, in the upper half jet-black with a narrow reddish line on the front edge, the tuft being black and 18 mm. long; the facial vibrissae are long and white; the tail in its basal half above is like the flanks, distally it has three black stripes and a black tip separated by white areas and the whole of its under side is white; the inguinal area is whitish, with some ochreous on the genital area, the abdomen and chest are pale ashy grey, paler than the flanks and without spots, and there is no band on the throat, the fore leg is pale buff in front, mainly black behind from the elbow downwards, and has three broad black stripes on its outer side, of which the uppermost below the elbow is continuous with the bracelet; the hind leg is coloured like the front and has three broad black stripes above the hock, blending with the blackish grey ground colour.

Measurements.—The dimensions in English inches of the made-up skin are: head and body, 28; tail, 14½; hind foot, 5; ear, 2.

Skull.—Unknown.

[1] The skin is dated January, but according to a note by the collector it was procured from a peasant and the date is consequently unreliable. From the condition of the wool, suggesting imminence of the moult, it may be inferred that this cat was killed at the close of the cold weather, perhaps as late in the year as May or June.

SPECIMEN IN THE COLLECTION

1	Near Yu-lin-fu, Ordos, Shensi (M. P. Anderson)	Duke of Bedford [P]	9.1.1.11 type

Felis margarita, Loche

(Synonymy under subspecies)

GEOGRAPHICAL DISTRIBUTION.—The deserts of the Sahara and of Turkestan.

DIAGNOSIS.— Distinguished from *Felis bieti* in external characters by the absence of the tuft on the ears[1] and by the presence of a mat of hairs on the soles of the feet concealing the pads either entirely or to a great extent.

SKULL.—The skull is like that of *bieti* in the reduction in thickness of the zygomatic excrescence adjoining the infraorbital foramen and in the small size of the inner lobe of pm^4; but differs in the size and structure of its bullae, which are more strongly inflated in three dimensions and less widely separated, their extreme length being considerably over one-fourth the condylobasal length and about equal to the upper cheek-teeth from the anterior edge of the canine to the tip of the posterior cusp of pm^4. Also, the tympanic or outer chamber of the bulla is greatly enlarged and occupies the greater part of the anterior portion of the bulla, reducing the front part of the entotympanic or inner chamber to a narrow space reaching the eustachian tube. The nasal bones are also longer than in *bieti*.

REMARKS.—The modifications of the feet and bullae of this cat suggest that it is much more completely adapted to desert life than *F. bieti*, and than several of the races of *F. lybica*.

Felis margarita margarita, Loche

1858. *Felis margarita*, Loche, Rev. Mag. Zool., 10, p. 49, pl. 1 (Ngoussa, near the Tripoli–Algerian border); and Expl. Sci. de l'Algérie, Mamm., p. 44, 1867; Lavauden, Bull. Soc. Hist. Nat. Afr. Nord, 19, p. 258, 1928; Flower, Proc. Zool. Soc., p. 389, 1932.
1867. *Felis marginata* (misprint for *margarita*), Gray, Proc. Zool. Soc., p. 275.
1897. *Felis caligata margaritae*, Trouessart, Cat. Mamm., 1, p. 363.
1904. *Felis libyca margueritei*, Trouessart, Cat. Mamm., Suppl., p. 273.
1905. *Felis ocreata margueritei*, Trouessart, Causerie Soc. Zool. France, 1, p. 386; Lavauden, La Chasse et la Faune cynégétique en Tunisie, p. 10, 1920.
1929. *Felis ocreata margaritae*, Antonius, Zool. Gart., 1, p. 375.

[1] There is a doubtful point connected with the ears. On dried skins there is nothing to suggest that they differ in shape or position on the head from those of *F. lybica*, and they are thus depicted in the illustrations published by Loche and Ognev. But according to Flower the ears in two living examples he saw in Egypt were set comparatively low down on the sides of the head as in *Otocolobus manul*. Ognev, however, drew particular attention to the large size of the ears compared with those of *F. silvestris*. In *Otocolobus* they are much smaller and more rounded at the tip.

1937. *Otocolobus margarita margarita*, Heptner and Dementiev, Mammalia, 1, pt. 6, pp. 227–42.
1938. *Felis margarita margarita*, Pocock, Proc. Zool. Soc., p. 41.

Geographical Distribution.—Deserts of the northern Sahara from Algeria possibly to Egypt.[1]

Colour.—General colour above "isabelline tawny", lightly ticked with black; the nape may be marked with four indistinct tawny-brown stripes, the flanks with some brownish red spots and obscure vertical stripes, with the thighs more strongly striped, but the pattern may be almost entirely wanting or, at most, only feebly defined; the back of the ear is ochreous, with a black spot at the apex.

This description is abridged from the accounts published by the authors quoted above, who between them had three skins from different localities, those described by Lavauden from Fort Polignac and by Heptner and Dementiev from Laghouat being regarded as typical *margarita*.

Some notes on the skull are given below under the description of the next race.

No specimen in the Collection.

Felis margarita meinertzhageni, Pocock

1938. *Felis margarita meinertzhageni*, Pocock, Proc. Zool. Soc., p. 43, text-fig. (skull) and pl. 1 (El Golea, latitude 30° N., Algerian Sahara).

Geographical Distribution.—Known only from the type locality.

Diagnosis.—Distinguished provisionally from typical *margarita*, judging from the descriptions of the latter quoted above, by the much more extensive black area on the distal part of the back of the ear, the middle part of the ear below the black being olivaceous grey.

Coat soft, long and full, 40 mm. long on the flank, 43 mm. on the spinal area. General colour above pale sandy grey, the contour hairs speckled black and buffish white; the spinal area blacker than the flanks, which show traces of eight or nine vertical stripes, stronger below than above, and are mottled with buff where the looseness of the coat exposes the under-hair; the under-hair of the mid-back is sooty, but fades on the loins and shoulders; there are about five stripes on the outer side of the thighs stronger than those of the flanks; the nape and crown of the head are less black than the back, the black of the nape tending to run into longitudinal streaks; the ears outside are ochreous at the base, olivaceous grey in the middle, extensively black distally, the black area covering about half the median length of the ear; the face is white between the eyes and on the fore part of the cheek, which is marked with a dark streak running backwards from the eye; the upper part of the muzzle, the cheek below the

[1] It is possible that some of the references quoted in the synonymy apply to pale, full-coated examples of *F. lybica lybica*. Lataste, at all events, assigned a specimen of the latter from Mettamer, Tunisia, to *F. margarita* (see above p. 61) and Hartert and Rothschild fell into the same error in connection with a cat from the Mzab district of the Algerian Sahara (see above p. 63).

ears and the side of the neck are rich buff; the lips, chin and fore throat are white, the hind throat and the rest of the under side, apart from some clean white on the axillary area of the chest, is buffy white or cream. The tail above is clearer grey than the back, almost white below, its basal half marked with obscure dark stripes which gradually increase in distinctness posteriorly, the terminal third with from three to four black stripes and a black tip. The fore leg is externally creamy, with the paws whitish; below the elbow it is encircled by two conspicuous black stripes which fuse behind and extend up to the elbow; below these stripes the back of the leg is pale buff to the carpal pad, but the area around this pad is fuscous, passing into the greyish brown mat of hairs covering the pads, but there is a longish black patch bordering this mat on the outer side behind; the hind leg is like the fore leg, creamy buff from the hock behind almost to the plantar pad, soles similarly clothed and with a similar black postero-external patch.

The flesh measurements in English inches of the type and only known specimen, an adult ♂, are: head and body, 18; tail, 11; hind foot, $4\frac{1}{5}$; ear, $2\frac{3}{5}$.

With the tail considerably more than half the length of the head and body and over twice the length of the hind foot, the proportions agree closely with those of *F. lybica*.

Skull.—The skull differs from that of the supposed typical *margarita*, described by Heptner and Dementiev, in a few dimensional characters. For instance, the width between the tips of the postorbital processes is nearly the same as the length from the occipital condyle to the posterior edge of the palate, instead of much less, and the mastoid width is about half the condylobasal length, instead of considerably more. These may be merely individual age differences.

As compared with that of *F. lybica*, the skull is broad in its cranial portion, the mastoid width being half the condylobasal length and the zygomata are noticeably salient; the nasals are unusually long, only a little compressed and project posteriorly considerably beyond the maxillae, their sides behind converging somewhat abruptly to form a slightly acutely angular point; the inflated bullae are separated by a space only about equal to a third of their width, and the groove marking the position of the partition between the two chambers forms an evenly curved line between the stylomastoid foramen and the orifice of the eustachian tube.

Specimen in the Collection

♂	El Golea, Algerian Sahara, lat. 30° N. (W. P. Lowe).	Col. R. Meinertzhagen [P]	34.8.2.8 (type)

Felis margarita airensis, Pocock

1925. *Felis margarita*, Thomas and Hinton, Ann. Mag. Nat. Hist., 9th ser., 16, p. 188.

1938. *Felis margarita airensis*, Pocock, Ann. Mag. Nat. Hist., 11th ser., 1, p. 472 (In-Abbangarit, west of Aïr, French Sudan, 800–1,000 ft.).

Geographical Distribution. French Sudan, known only from type locality.

Diagnosis. Distinguished from the previously described Northern Saharan races of *margarita* by its shorter winter coat and by the soles of the feet being less luxuriantly clothed with hair which does not entirely conceal the pads;

Fig. 6.

Side and lower view of adult skull of *Felis margarita airensis* from In-Abbangarit, west of Air.

the colour also is apparently paler and the pattern better defined, especially on the crown and spinal area. Distinguished in addition from *meinertzhageni* by having noticeably less black speckling in the contour hairs of the dorsal surface, the under-hair of the spinal area is rich ochreous buff, not sooty; the face is much whiter; the ears behind are bright buff throughout, except for the fuscous patch at the tip, which is much smaller than in *meinertzhageni*; the crown has six tolerably well-defined rows of long spots forming lines which are traceable

over the nape and shoulders; the spinal area of the hind back has two black longitudinal stripes and the vertical stripes on the flanks are more distinct and buffy; the under side from the throat backwards is clean white, not tinged with buff; the stripes on the fore legs are less well developed, and on the sole of the hind foot the spot close to the plantar pad is buffy, not black.

Since only one skin of each of these two races has been described, the differences may prove to be less pronounced when several are available for comparison.

Flesh measurements in English inches of the type and only known specimen, an adult ♀, are: head and body, 15⅜; tail, 9⅘; hind foot, 4; ear, 2.

The skull is similar to that of *meinertzhageni*, but is smaller in accordance with the difference in sex; but the teeth are approximately the same size.

Specimen in the Collection

In-Abbangarit, west of Aïr	Capt. A. Buchanan [C & P]	39.1673 type

Felis margarita thinobius, Ognev

1927. *Eremælurus thinobius*, Ognev, Annu. Mus. Zool. Acad., St. Petersb., 27, p. 356 (1927) (Kepetek, Transcaspia); *id.* Zeitschr. Säuget., V, p. 76, 1930; *id.* Mamm. U.S.S.R., etc., 3, p. 170, pl. 3, text-figs. 78–80, 1935; Bilkevich, Trudy Zool. Inst. Akad. Nauk., 2, pp. 1–3, 1934.

1937. *Otocolobus margarita thinobius*, Heptner and Dementiev, Mammalia, 1, pt. 6, pp. 226–42.

1938. *Felis thinobius*, Pocock, Proc. Zool. Soc., ser. B, 108, p. 45.

Geographical Distribution.—The deserts of Karakum and Kizil-Kum, Transcaspia.

Diagnosis.—Distinguished from the preceding Saharan races at least by its larger size, judging from the recorded flesh and cranial measurements of both sexes.

According to Heptner and Dementiev this cat can only provisionally be regarded as representing a distinct race from typical *margarita* on account of its slightly darker colouring on the average. The available skull and flesh measurements of both sexes, however, suggest that *thinobius* is a little larger than the Saharan races. For instance, the average condylobasal length of two adult ♂ skulls of *margarita* from Algeria and El Golea is nearly 10 mm. less than in three adult ♂♂ of *thinobius*. Superiority in size of the latter is also indicated by the flesh measurements.

Owing to the wide discontinuity in distribution between *thinobius* and *margarita*, I treated the two as distinct species in 1938, not having seen Heptner's and Dementiev's paper at that time; and I suggested that the likeness between them might be due to the independent acquisition of closely similar features in adaptation to similar conditions, the one being descended from a North African, the other from an Asiatic representative of *F. lybica*. This view at least supplies an explanation of the otherwise puzzling geographical severance of the two.

There are no specimens in the Collection of the British Museum.

SKULL MEASUREMENTS OF THE RACES OF *FELIS MARGARITA* AND OF *FELIS BIETI*

Sex	Locality	Number	Total length	Cond. bas. length	Zygom. width	Cranial width	Postorb. width	Int. orb. width	Max. at canines width	Length and width of Bulla	Med. length of nasals	Upper cheek teeth	pm^1	m_1
	F. m. margarita		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Algeria	(*vide* Heptner)	85½	80	—	—	—	—	—	—	—	—	—	—
	F. m. meinertzhageni													
♂ ad.	El Golea (type)	34.8.2.8	91	85	70	44	33	19	23	25 : 17	25	28	11	7½
	F. m. airensis													
ad.	Air (type)	39.1673	81	77	62	42	33	15	19	23 : 16	23	26	10	7
	F. m. thinobius													
♂ ad.	Turcomania	(*vide* Bilkevitch)	103	95½	—	—	—	—						—
♂ ad.	Transcaspia	(*vide* Ognev)	95½	90	72	46	34	20	—	28 : 17½	25	30	11	8½
♂ ad.	,,	,,	90½	86	74	51	35½	19	—	24 : 17	22	—	11	9½
ad.	,,	,,	87	83½	65½	44	34	18	—	25 : 16½	22½	—	10½	8
ad.	,,	,,	84	—	66	46	37	17½	—	20½ : 15	19	—	11½	9
	F. b. bieti													
sb.ad.	Minshan, Kansu	(*vide* Lönnberg)	(99)	94	74½	51	37½	19½	(23)	24½ : 15½	19½	33	12	9
	F. b. dutuchta													
	Goizso, S. Gobi (type)	(*vide* Birula)	97	(? 89)	70	—	—	—	—	—	—	—	—	—

SOME FLESH MEASUREMENTS OF THREE RACES OF *FELIS MARGARITA*

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
	F. m. meinertzhageni		in.	in.	in.	in.
♂ ad.	El Golea, Algerian Sahara (type) . .	34.8.2.8	18	11	$4\frac{4}{5}$	$2\frac{2}{5}$
	F. m. airensis					
♀ ad.	In-Abbangarit, w. of Aïr (type) . .	39.1673	$15\frac{3}{5}$	$9\frac{4}{5}$	4	2
	F. m. thinobius					
♂ ad.	Turcomania . .	(*vide* Ognev)	$22\frac{4}{5}$	14	$4\frac{4}{5}$	$2\frac{2}{5}$
♀ ad.	Transcaspia . .	(*vide* Ognev)	$18\frac{2}{5}$	$11\frac{3}{5}$	—	—

Felis nigripes, Burchell

(Synonymy under subspecies)

GEOGRAPHICAL DISTRIBUTION.—South Africa, Damaraland, throughout Bechuanaland, Griqualand West; the Transvaal at Kleaksdorp; Orange River Colony and the Cape Province south of the Orange River, at least from Hanover to Beaufort Fort and Grahamstown.

DIAGNOSIS.—Distinguished externally from the other species of *Felis* by its small size, more heavily banded limbs, and the contrast in colour between the crown of the head and the nape of the neck; and from all except some races of *F. lybica ornata*, for example, by the prevalence of a very conspicuous pattern, dominantly of spots, in the adult at all seasons of the year; and from all, except *F. chaus*, by the shortness of the tail, which is typically decidedly less than half the length of the head and body. It resembles *lybica* and *chaus* in possessing a spinal crest; but, as in *sylvestris*, typically, and *margarita*, there is no tuft on the ears. There is also a marked fusion, very noticeable in most skins, of the spots on the flanks behind the shoulders to form the vertical stripes so characteristic of typical *Felis*; and the pupil of the eye contracts to a vertical slit as in *sylvestris*, *lybica*, and others.

SKULL.—The skull is short, much shorter than in *F. margarita*, but in its general shape and width proportions is tolerably similar, although the orbital part of the zygomatic arch is more salient and arcuate, the facial line is more abruptly and steeply inclined from the frontals, and the nasals are much shorter and strongly compressed. The bullae are not so strongly inflated in three dimensions and the outer chamber, although larger than in *Felis lybica*, is not so expanded in front as in *F. margarita*, but the auditory orifice is relatively larger. The malar thickening above and outside the infraorbital foramen is not suppressed quite to the same extent as in *F. margarita*, but, although reduced, it is still visible and varies slightly in prominence individually. The inner lobe of the upper carnassial (pm^4) is still more reduced in size than in *F. margarita*

meinertzhageni. The essential characters of the skull were figured and described in my paper quoted above.

Remarks.—As I pointed out in that paper in which I described this little cat from the living animal, from skins and a skull, the species is unmistakably like typical examples of *Felis*. Upon the evidence supplied by the skull characters there described, Roberts separated *nigripes* from *Felis* and made it the type of a distinct genus *Microfelis*. This name I unhesitatingly reject because its acceptance obscures the obvious and close kinship between the species and other forms assigned to *Felis*, and thus defeats the chief function of nomenclature as an instrument for expressing affinity.

Felis nigripes nigripes, Burchell

1824. *Felis nigripes*, Burchell, Travels, 2, p. 592 (Litakun, near Kuruman, South Bechuanaland; A. Smith, S. Afr. Quart. Jour., 2, p. 123, 1834; Layard, Cat. Mamm. S. African Mus., p. 39, 1861; Matschie, S.B. Ges. Nat., Fr. Berlin, p. 258, 1894; Bryden, Great and Small Game, p. 582, 1899; W. L. Sclater, Mamm. S. Afr., 1, p. 40, 1900; Pocock, Proc. Zool. Soc., 1907, pp. 669–74, figs.

1926. *Microfelis nigripes*, Roberts, Ann. Tr. Mus., 2, p. 250; Shortridge, Mamm. S.W. Africa, 1, p. 95, 1934.

1931. *Felis* (*Microfelis*) *nigripes nigripes*, Shortridge, Rec. Albany Mus., 4, pp. 119–21.

Geographical Distribution.—The drier portions of South Africa from about 20° S. on the west coast southwards to the Alexandria and Fort Beaufort divisions and east to the western borders of the Transvaal.

Diagnosis.—Most of the available skins were received from natives, and have unreliable or no dates; but the series shows that the coat varies in thickness and length no doubt seasonally, possibly locally. The crest, for instance, in a short-haired native skin from the deserts west of Bamangwato (Selous) is only 30 mm., whereas in a mid-winter skin reliably dated July 24, from Deelfontein (Grant), it is up to about 53 mm. Its usual length is about 45 mm. and the rest of the coat varies accordingly.

Colour.—The tint of the ground colour of the upper side varies considerably. One skin from Gobabis (Shortridge), two from Bechuanaland (Shortridge) and three from the desert west of Bamangwato (Selous)—all undated native skins—are brightish creamy fawn and very much alike, with slight individual differences, the one from Gobabis being a trifle paler than the others. Between the latter and the two skins (Zool. Soc.) said to have come from the Zambesi, which are much darker and more ochreous brown, the contrast is marked. Two winter skins from Deelfontein, 100 miles south of the Orange River (Grant), are duller coloured, but one, dated April, has a sandy buff wash only slightly paler than Bechuanaland skins, whereas the other, dated July, is grey with hardly a trace of the brighter tint. These two suggest that the colour fades

with advancing winter. Two from Vredefort Road, Orange River Colony (Barrett-Hamilton), also differ. One, dated November, closely matches the April Deelfontein skin, whereas the other is brighter and fits in with the Bechuanaland series.

The pattern also varies in intensity, very likely seasonally or with age, but typically the black spots are diluted with buff, so that on the flanks they contrast

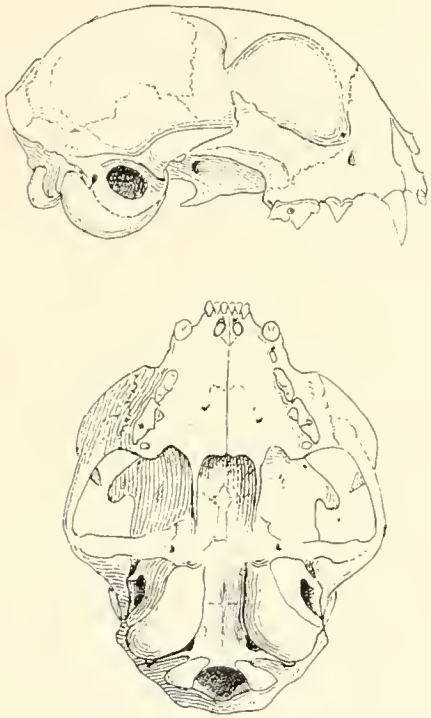

Fig. 7.

Side and lower view of adult ♀ skull of *Felis nigripes* from Deelfontein, Cape Province.

more or less with the black leg stripes; on the sides of the neck they are always buffy and sometimes also on the nape, where they may be quite indistinct and broken, as in the two skins from Deelfontein, and those from the "Zambesi"; but the four on the nape may be black and well defined, as in the skins from Gobabis, Bechuanaland, and Vredefort Road, although they break up into spots where they pass forwards on to the forehead; the three throat stripes may be

black and well defined, although bordered with buff, as in the skins from Deelfontein and Vredefort Road.

Although the mid-winter skin from Deelfontein differs noticeably from those found to the north of the Orange River in the fading of practically all the ground colour to grey, the other is inseparable from the Bechuanaland skins. They were shot, Grant tells me, amongst rocks in typical open Karroo country overgrown with scrub.

MEASUREMENTS

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
	F. n. thomasi		in.	in.	in.	in.
♂ ad. ?	Grahamstown (type of *thomasi*)	(*vide* Shortridge)	17	8	—	—
♂ ad. ?	Fort Beaufort	,, ,,	17 1/5	8	4 3/5	2 1/5
	F. n. nigripes					
♀ yg. ad.	Deelfontein	2.12.1.4	15	6 1/5	3 3/5	2
♀ yg. ad.	,,	2.12.1.5	15	6 1/4	3 2/5	2 1/5
♀ yg.	"Zambesi"	39.677	15	6 3/5	3 1/2	2
♂ yg.	,,	39.679	13 1/2	6 3/4	2 1/4	—

Judging from the measurements of their skulls, as shown in the next table, the first two on this list are just adult ♂♂. It may be added that Burchell gave the length of the head and body of seventeen skins as varying from 16 to 18 in.

In the following table of skull measurements, the first three, including the type of *thomasi*, were recorded by Shortridge; the fourth, a topotype of *nigripes* by Sclater, the rest being in the British Museum.

I judge the specimen from Tapelberg to be an old ♂ because of its comparatively great zygomatic width and the specimen from Kuruman to be a young adult ♂ on account of the narrowness of that dimension. It is even younger, no doubt, than the ♀, Deelfontein (2.12.1.5), which has the same zygomatic width, although a noticeably shorter skull and cheek-teeth.

SPECIMENS IN THE COLLECTION

1	Near Gobabis, Damaraland (G. C. Shortridge)	Percy Sladen Trust [P]	26.12.7.31
2	Bechuanaland (G. C. Shortridge)	,, ,,	35.9.1.160–1
3	Desert west of Bamangwato, Matabeleland	F. C. Selous [C & P]	85.11.27.1–2 86.2.15.1
♂ ♀	Zambesi (purchased alive, Port Elizabeth)	Zoological Society [P]	39.677,679
1 ad., 1 juv.	Vredefort Road, Orange River Colony	Major G. E. H. Barrett-Hamilton [C & P]	4.3.1.14–15
2 ♀	Deelfontein, Cape Province (Capt. C. H. B. Grant)	Col. A. Sloggett, [P]	2.12.1.4–5

Skull Measurements of the Races of *Felis nigripes*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bulla*	*Upper cheek teeth*	*pm^4*	*m_1*
	F. n. thomasi		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
? ♂ old	Tapelberg . .	(*vide* Shortridge)	87	—	67	—	—	—	—	—	—	—	—
? ♂ ad.	Fort Beaufort .	,,	85	—	60	—	—	—	—	—	—	—	—
? ♂ ad.	Near Grahamstown (type of *thomasi*)	,,	84	—	61	—	—	—	—	—	—	—	—
	F. n. nigripes												
♂ yg. ad.	Kuruman . .	(*vide* Sclater)	82	—	58	—	—	—	—	—	—	—	—
	Topotype *nigripes*												
♀ ad.	Deelfontein . .	2.12.1.4	77	70	56	39	30	14	19	19 : 14	23	10	6
♀ yg. ad.	,, . .	2.12.1.5	77	70	58	40	31	14	19	19 : 14	24	10	6
♀ yg. ad.	"Zambesi" . .	39.177	72	67	53	38	28	13	18	18 : 14	22	10	6

Felis nigripes thomasi, Shortridge

1931. *Felis* (*Microfelis*) *nigripes thomasi*, Shortridge, Rec. Albany Mus., 4, pp. 119–21 (Thorn Kloof, near Grahamstown).

Geographical Distribution.—The Southern Karroo as far east as Fort Beaufort (Shortridge).

Diagnosis.—Distinguished, according to the description, from typical *nigripes* by being altogether less sandy and bleached-looking, more "saturate" from inhabiting an area with greater rainfall, the pattern everywhere well defined and black, only to an infinitesimal extent flecked with scattered buff hairs, so that there is no appreciable contrast between the spots on the flanks and the stripes on the legs. The four nape stripes are strong and pass on to the forehead unbroken, the two admedians being continued behind on to the rump as a row of spots on each side, and the three throat stripes are intensely black, unbroken, and only narrowly edged with rufous.

Remarks.—Shortridge had altogether seven skins of this race from the typical locality, from Fort Beaufort and Tapelberg. These he compared with ten skins from Bechuanaland and one from Griqualand West, and his description of the latter agrees in a general way with the skins in the British Museum here assigned to the typical race. But the considerable variation in the colour and pattern exhibited by the latter, in part pointed out by Burchell in his series, shows the differences between the two to be less pronounced than Shortridge's description suggests. His idea, moreover, that the Orange River is the boundary between the two races is negatived by the occurrence at Deelfontein of skins agreeing better with the more northern type than with those described as *thomasi*.

No specimen in the Collection.

Felis chaus, Güldenstädt[1]

(Synonymy under subspecies)

Geographical Distribution.—From the Caucasian and South-east Caspian areas, Turkestan and Persia, thence westwards through Mesopotamia and Syria to Egypt and eastwards through Baluchistan to India, Ceylon, Burma, and Indo-China.

Diagnosis.—The largest of the existing species of *Felis*, with the tail comparatively short, almost invariably less than half the length of the head and body, and less than twice the length of the hind foot. There is a distinct spinal crest and a small tuft on the ears. The general colour above varies from clear grey to tawny or deep brownish, dependent on the tint of the speckling of the pelage, which is black and white or buff or ochreous, the spinal crest being richer and darker; the backs of the ears vary from nearly uniformly ochreous, with at most a small black tip, including the "pencil", to extensively black at

[1] Some authors reject Guldenstädt as the author of this name on the grounds that he did not publish it in accordance with the binominal system of nomenclature. Its ascription to him or Schreber is a matter of very little moment.

the tip and base and ochreous in the middle; the under side is sometimes almost entirely white, except for a broad buffish collar on the hind throat, but usually the chest behind the fore legs is invaded by buff, and sometimes most of the under side is rich ochreous-buff with only the fore throat and chin, the axillae, and the inguinal region whitish; the cheeks, muzzle, and outside of limbs are greyish or ochreous, and the tail typically paler than the body. The pattern on the head and back is absent, on the flanks it is at most faintly traceable; there are some spots on the chest below, an indistinct stripe on the throat collar and two brachial stripes varying in distinctness on the fore leg. Similar stripes are present on the hind leg above the hock; the tail has an irregular blackish stripe above in its proximal portion, its distal end being conspicuously striped black and white, with tip black. The kitten has a pronounced pattern.

The only external character by which skins of this species can always be distinguished from *F. lybica* is the comparative shortness of the tail. The skull, too, is similar in all its essential features, but when fully mature may be distinguished by being a little more elongated in the muzzle and by being narrower across the orbital portion of the zygomata, with the cheek lower, both features due to the less developed lower rim of the orbit.

Felis chaus chaus, Güldenstädt

1776. *Felis chaus*, Güldenstädt, Nov. Com. Acad. Petrop., 20, p. 483, pls. (Terek River, north of the Caucasus); Schreber, Säugetierk, 3, p. 414, pl. 90, 1778.
1811. *Felis catolynx*, Pallas, Zoogr. Ross. Asiat., 1, p. 23 (Terek River, north of the Caucasus).
1876. *Felis shawiana*, Blanford, Journ. As. Soc. Beng., 45, p. 49 (Yarkand); *id.* Sci. Res. 2nd Yarkand Miss.: Mamm., p. 17, pl. 1, 1879 (in part, skull only, which is marked type).[1]
1889. *Felis chaus*, Radde and Walter, Zool. Jb., 4, Syst. p. 23.
1898. *Felis chaus typica*, de Winton, Ann. Mag. Nat. Hist., 7th ser., 2, p. 291.
1905. *Catolynx chaus*, Satunin, Mitt. Kauk. Mus., 2, p. 320.
1907. *Catolynx chaus typicus*, *id. op. cit.*, 3, p. 62.
1935. *Felis* (*Chaus*) *chaus chaus*, Ognev, Mamm. of U.S.S.R., etc., 3, p. 159.
1939. *Felis chaus chaus*, Pocock, Fauna Brit. India, Mamm. 1, p. 292.

Geographical Distribution.—Turkestan, Caucasus, Persia, Baluchistan.

Colour.—General colour varying from tawny with rich ochreous spinal stripe to clear grey with no tawny and dull greyish buff spinal stripe; backs of the ears with well-coloured patch varying from rusty ochreous to bright buffy ochreous; legs varying from pale ochreous to faintly buffy grey, hind leg sometimes black behind from the hock downwards, but the black sometimes restricted to the region of the pads; pattern consisting of the normal stripes on the distal half of the tail and of the two on the back of the fore leg below the

[1] The composite nature of this alleged "species", consisting of skins of *F. constantina caudata* and a skull of *F. chaus*, was explained in vol. 1, *Mamm. Brit. India*, p. 290, 1939. Since the skull is marked as the type *shawiana* falls as a synonym of *chaus*.

elbow; the thighs are usually striped externally and sometimes traces of spots can be detected elsewhere.

The following descriptions show the variations in the skins ascribed to this race. Similar variations occur in good series of skins of other races of *F. chaus* and need not be referred to in detail.

Caucasus (Warsaw Museum, 79.11.15.5). A young adult ♂. The winter coat is full and soft, 44 mm. long on the flanks, 64 mm. on the crest. General colour of flanks buffy grey, the hairs speckled fuscous and buffy white at the tip; under-hair pale buff, the crest is darker sandy buff or pale ochreous and black, with the under-hair richer; the shoulders, nape and crown more conspicuously black-speckled than the flanks; the forehead is richer than the crown, whitish on each side between the eyes, a black patch in front of the eye, the upper side of the muzzle richer, more rusty buff than crown and the lips and chin white; the ears are dull ochreous with the lips black and the base slightly darkened, the tail at the base is like the back, with the distal half clear grey, emphasising three black stripes and a black tip; the fore legs are ochreous, pale buff behind, with some black about the pads and two well-defined stripes below the elbow; hind legs above like the flanks externally, with about four stripes ochreous inside and on each side of scrotum, below the hocks ochreous in front, black behind from the heel; the fore throat, axillary and inguinal areas white; hair of the abdomen and chest buff at the tip, white at the base.

Persia (K. Loftus, 53.1.6.86). Coat thick, contour hairs 40 mm. on the flanks, 57 mm. on the crest. Colour of the flanks nearly as in the Caucasus skin, but the crest darker and richer ochreous, its under-hair brightish buff, that of the flanks also more buffy; ears more rusty; legs about the same, but the black on the hind only extending half-way up to the hock; stripes well pronounced on front and hind legs.

Gursala, Jiruft, Persia, 2,000 ft. (H. R. Sykes, 4.6.1.1), January. Coat full and soft, crest-hairs about 62 mm. Colour of the entire upper side from the head backwards cleaner grey than in the preceding two skins, speckled fuscous and nearly white; the crest much duller, pale buff, not so ochreous; ears rich ochreous, with black tip, but no darkening at the base; legs paler and greyer, the black below the hock as in Loftus's skin. Only on the ears is this skin so well coloured as the others.

Seistan (Calcutta Museum, 6.1.2.3). Coat, probably summer, shorter than in the preceding, the hairs on the flanks 35, on the crest 45 mm. Colour very closely matches that of the Caucasus skin above and below, but the flanks and thighs showing faint spots, probably a seasonal difference connected with the shorter coat.

Pir-i-Banu, 9 miles south of Shiraz (J. B. Hotson, 37.3.24.19), January. Coat long and full, flank hairs 48, crest hairs 68 mm. Colour greyer than in the skins from the Caucasus and Seistan, but not so silvery, as in the skin from Gursala; the ears paler and yellower than in any of the preceding, sharply contrasted with those of Loftus's skin.

Baluchistan, 100 miles east of Bampur, south of the Jebel Bariz Range (P. M. Sykes, 94.10.17.2), March. A flat, native skin with the flank hairs 41,

Skull Measurements of *Felis chaus chaus*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Mand. length*	*pm^4*	*m_1*
			mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Russian Turkestan	(*vide* Ognev)	129·7	—	88	36·3	25·2	34·3	—	15·9	12·2
♂ ad.	,, ,,	,,	121	103·2	80	38·2	22·9	31	—	14·9	10·7
♂ ad.	,, ,,	,,	132	119·2	85	38·3	25·5	34	—	15·1	12
♂ ad.	,, ,,	,,	124	114	80	36	23	31·5	—	14·2	10·7
♂ ad.	Caucasus	(*vide* Güldenstädt)	127	—	85	—	—	30·5	—	14·5	10
♂ yg. ad.	,,	79.11.15.5	—	107 ±	76	35	21	28·5	80	15	10
♂ ad.	Seistan	6.1.2.3	132	120 ±	79	35	26	33	89	14	11
♂ yg. ad.	South Persia	53.1.6.86	119	108	78	—	—	29	80	14·5	11
♀ ad.	Russian Turkestan	(*vide* Ognev)	120	110·2	72	37·2	21	28·2	—	13·4	10·2
♀ ad.	,, ,,	,,	109·2	100·3	69·2	36	20	27	—	13·8	10
♀ ad.	,, ,,	,,	106·8	98·2	68·3	34·3	18·5	26·2	—	13·2	9·3
♀ yg. ad.	Yarkand, type *shawiana*	——	107·5	100	73·5	30	20	25	—	12·5	10
♀ ad.	Seistan	8.1.13.4	113	100	73	34	18	26	73	13	10
♀ yg. ad.	Gursala, Persia	4.6.1.1	109	99	70	33	18	25	71	13	10

the crest hairs 58 mm. Colour palish silvery grey, very like the skin from Gursala and with a dull spinal stripe, but with the ears pale and yellowish, as in the skin from Shiraz.

Only two of the skins in the British Museum were measured in the flesh. These are entered below, together with the dimensions of two recorded by Nehring (*SB. Ges. Nat. Fr. Berlin*, 1902, p. 124), which I take to be ♂♂.

Measurements

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*
			in.	in.	in.
♂ ad.	Caucasus	(*vide* Güldenstädt)	30$\frac{2}{5}$	11$\frac{1}{5}$	6$\frac{3}{4}$
♂ ad.	Derbent	(*vide* Nehring)	29$\frac{1}{5}$	10$\frac{4}{5}$	6$\frac{1}{5}$
♂ ad.	North Persia	,, ,,	27$\frac{1}{5}$	11$\frac{1}{5}$	6$\frac{2}{5}$
♂ ad.	South of Shiraz	37.3.24.19	27$\frac{3}{5}$	11$\frac{1}{5}$	6$\frac{1}{5}$
ad.	Gursala, Persia	4.6.1.1	24	10$\frac{1}{5}$	5$\frac{4}{5}$

The first two entries suggest that examples from north of the Caucasus may be larger than those from Persia. But Güldenstädt's specimen has the skull shorter than one in the British Museum from Seistan, and was probably a little shorter in the head and body.

Skull.—Güldenstädt did not record the condylobasal length in his skull, but gave the basal and the total lengths as 110 and 127 mm. respectively, both a little less than in the skull from Seistan. From Russian Turkestan Ognev had four ♂ skulls, presumably adult, ranging from 132 to 121 mm. in total length, their respective condylobasal lengths being 119 and 103 mm. The larger of the two is the same size in those two dimensions as the skull from Seistan. The average condylobasal length in four adult ♂♂ and in the two young adult ♂♂ in my table is 113 mm.

In Ognev's skulls pm^4 ranges in length from 15·9 to 14·2 mm.; in the British Museum skulls the range is from 15 to 14 mm., the average of the series being 14$\frac{3}{4}$ mm.

Specimens in the Collection

♂	Caucasus	Warsaw Museum [P]	79.11.15.5
1	South Persia	Kenneth Loftus [C & P]	53.1.6.86
1	Seistan	Calcutta Museum [P]	6.1.2.3
	,,	Col. A. L. Kennion [C & P]	8.1.13.4
	Gursala, Jiruft, Persia	H. R. Sykes [C & P]	4.6.1.1
♂	Pir-i-Banu, 9 miles south of Shiraz (Sir J. B. Hotson)	Bombay Nat. Hist. Soc. [P]	37.3.24.19
1	South of Jebel Bariz Range, 100 miles east of Bampur, Baluchistan	Sir P. M. Sykes [P]	94.10.17.2

Felis chaus furax, de Winton

1898. *Felis chaus furax*, de Winton, Ann. Mag. Nat. Hist., 7th ser., 2, p. 293 (Jericho); Anderson and de Winton, Mamm. of Egypt, pp. 178 and 182, 1902[1]; Nehring, SB. Ges. Nat. Fr. Berlin, 1902, p. 147; Pocock, Mamm. Brit. India, 1, p. 294, 1939.

1902. *Lyncus chrysomelanotis*, Nehring, S.B. Ges. Nat. Fr. Berlin, pp. 124 and 147[2] (the Jordan).

1920. *Felis chaus*, Cheesman, Journ. Bomb. Nat. Hist. Soc., 27, No. 2, p. 8.

Geographical Distribution.—Southern Syria and Mesopotamia (Iraq).

Diagnosis.—Closely resembling the typical form, but distinguished by the larger teeth on the average. In three ♂♂ and five ♀♀ of *furax* the average length of pm^4 is 16 and 15 mm. respectively, the same in eight ♂♂ and six ♀♀ of *chaus* being 14·8 and 13+ mm. respectively. In the type of *furax* from Jericho the difference in the size of the teeth is pronounced; but specimens from Iraq, as might be expected, come nearer typical *chaus* in this respect, and also in the larger size of their skulls.

Colour.—Some skins of the two races are practically indistinguishable, but on the average *furax* seems to be slightly greyer with less buff in the dorsal pelage and whiter below, with the pale patch on the ears rather less conspicuous.

The coat varies in thickness seasonally, but very little in length, the crest hairs being 50 mm., or a little over, and the flank hairs about 35 mm.

Some features of individual skins are as follows:

The skin of the type from Jericho differs from that of the Caucasian example of *F. chaus chaus* in being a trifle greyer above, with the crest more emphasised; the ears are a little darker, with a larger black tip; the legs are a little less ochreous and the buff of the under side is not so bright.

A ♂ from Baghdad (La Personne), September 25, has the coat less full and soft than in the type, but only a trifle shorter, the hairs on the crest being about 55 mm. and on the flanks about 33 mm. The general colour is almost the same, but the dorsal band is not quite so well defined, the head is darker, the ears not so red, with a rather bigger black tip and a conspicuous black patch at the base; the legs are greyer but, as in the type, the hind foot is black behind, below the hock. The pattern is more pronounced on the outsides of the legs, there are stripes traceable on the nape and obscure spots on the shoulders and flanks. A ♀ from Baghdad, with the same date, differs in being greyer, the pale rings in the hairs being whiter, the dorsal line fainter, the head not so dark, and the basal ear-spot much less pronounced; the legs have less black on their soles; the lower side is not nearly so buff, almost wholly white, and the inside of the legs are whitish; the pattern is less distinct everywhere, faint on the under side and none on the nape or flanks.

[1] Before de Winton's paper was published in 1898, the essential character of the type of this race was detected and described by Anderson, who, however, did not propose a name for it.

[2] When Nehring described this alleged species (p. 124) he was unaware of de Winton's description of *furax*, but later (p. 147) he considered the two and decided that they were distinguishable forms mainly because of the smaller teeth of *chrysomelanotis*. The differences in the teeth and skulls are merely sexual and age characters.

A ♀ from Shahroban, about 50 miles north-east of Baghdad (F. P. O'Connor, 32.2.1.77), December, has the winter coat fuller, but only a little longer than in the Baghdad specimens, and the colour a paler, clearer grey, with the black and white speckling in the hairs more in evidence and the spinal stripe faint, as in the Baghdad , but the ears browner, as in the type from Jericho.

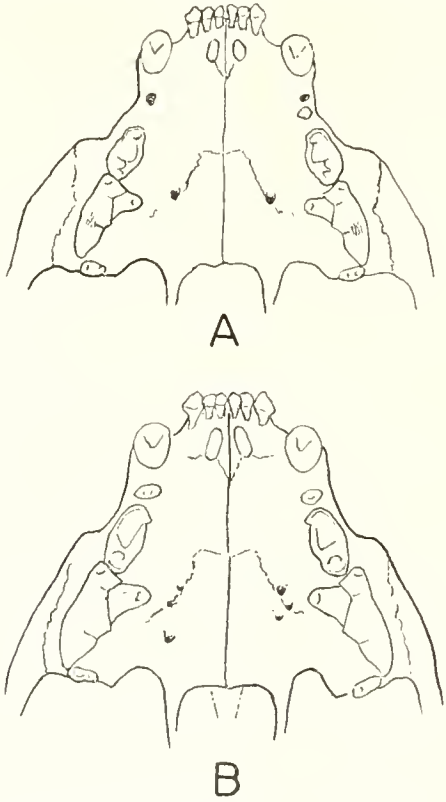

Fig. 8.
A.—Adult ♂ skull of *Felis chaus affinis*, Kuwapany, Nepal.
B.—Adult ♂ skull of *Felis chaus furax*, Jericho.

A ♀ from Mosul, 200 miles north-west of Baghdad (Captain Fitzpatrick, 21.7.17.1), March 8, is very like the last in the colour, length and thickness of the winter coat, but the dorsal band is darker, as in the type from Jericho, the leg stripes are a little more distinct, and the back of the ear is browner, with no bright hue below the black tip.

MEASUREMENTS OF SKULL AND TEETH OF SPECIMENS ASSIGNED TO *FELIS CHAUS FURAX*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Mand. length*	pm^4	m_1
			mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Ramadi, Iraq . .	36.4.14.35	138	124	89	34	25	35	92	16	11
♂ yg. ad.	Baghdad, Iraq . .	32.2.1.76	131	118	83	35·5	22	31	86	15	11
♀ ad.	Baghdad . . .	32.2.1.75	—	—	—	—	—	—	80	—	10·5
♂ yg.	Jericho (type) . .	64.8.17.4	110	102	71	35	19	28	73	17·5	12
♀ ad.	Mosul, Iraq . .	21.7.17.1	—	—	—	—	18	28	—	16	11
♀ ad.	Ramadi, Iraq . .	36.4.14.36	122	110	77	35	20	28	81	15	11
♀ ad.	Dead Sea . . .	(*vide* Nehring)	113	—	75	—	20+	28	76	15	10·3
♀ ad.	Jordan . . .	,,	112	—	73·5	—	19+	28·5	75	15−	11
♀ ad.	,, . . .	,,	110	—	71	—	18·3	28	73	14	10·2

In the following table of measurements in English inches those of the ♂♂ from Baghdad were taken in the flesh. I do not know whether this was the case in Nehring's two co-types of *chrysomelanotis*. The dimensions are about the same as in *F. chaus chaus*.

MEASUREMENTS

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*
			in.	in.	in.	in.
♂ yg. ad.	Baghdad	32.2.1.76	30½	10½	6½	3
♂ yg. ad.	,,	32.2.1.75	26	10	6	3
♀ ad.	Jordan	(*vide* Nehring)	26⅝	9⅛	5⅝	—
♀ ad.	,,	,, ,,	26⅜	9⅜	5⅝	—

SKULL.—As stated above, the Iraq specimens assigned to this race are intermediate between typical *chaus* and *furax*. This is borne out by the skulls, which in size are about the same as *chaus*, whereas their teeth are more like those of *furax*. The skull of the type of *furax*, the only ♂ skull known from Palestine, is obviously undeveloped, the temporal ridges being far apart, defining a lyrate area 22 mm. wide in the middle of the parietals, and the canine teeth are not fully protruded. The teeth are quite unworn and exceptionally large, but the immaturity of the skull gives them a deceptively large appearance. The upper carnassial is only 1 mm. longer than that of a skull from Ramadi, near Baghdad. Otherwise the dental dimensions of the two are very nearly the same. It is not possible to guess what length the skull from Jericho would have reached; but it does not seem likely that it would have attained that of the ♂ skull from Ramadi, the largest skull of *F. chaus* yet recorded, or even that of the young adult ♂ from Baghdad which is practically full-sized.

The same applies to the ♀ skulls. The three recorded from Palestine by Nehring are a good deal shorter than Cheesman's ♀ skull from Iraq and their mandibles are correspondingly shorter than that of La Personne's ♀ from Baghdad; but the five skulls agree very closely in the size of their teeth. Moreover, the difference in the length between even the shortest of Nehring's skulls and the ♀ skull from Iraq is a little less than the difference between the longest and the shortest ♀ skulls of *F. chaus chaus* recorded by Ognev from Russian Turkestan; and in his ♂ skulls the difference amounts to 11 mm.

SPECIMENS IN THE COLLECTION

♂	Jericho	Canon H. B. Tristram [C & P]	64.8.17.4 (type)
	Mosul (Capt. L. V. Fitzpatrick)	Bombay Nat. Hist. Soc. [P]	21.7.17.1
♀	Baghdad (V. S. La Personne)	,, ,,	32.2.1.75–6
	Shahroban, 50 miles north-east of Baghdad (Col. F. P. O'Connor)	,, ,,	32.2.1.77
♀	Ramadi, Iraq (Major R. E. Cheesman)	Sir P. Z. Cox [P]	30.4.14.35–6

Felis chaus nilotica, de Winton

1804. *Felis libycus*, Olivier, Voy. Emp. Othom., 2, 41 (not *F. lybica*, Meyer).

1818. *Felis chaus*, Geoffroy and Audouin, Descr. de l'Egypte, Hist. Nat. 2, p. 746; *ibid.* ed. 8vo, Suppl. 23, p. 210, 1828; Cretzschmar, Rüpp. Atlas, Zool., p. 13, pl. 4, 1826; Temminck, Monogr. Mamm., pl. 4, p. 121, 1824 (in part); F. Cuvier, Hist. Nat. Mamm., 1826.

1832. *Felis rüppelii*, Brandt, Bull. Soc. Nat. Mosc., 4, p. 209 (not *F. rüppellii*, Schinz).

1866. *Lynx rüppellii*, Fitzinger and Heuglin, S.B. Ak. Wiss. Wien, 54, p. 557.

1898. *Felis chaus nilotica*, de Winton, Ann. Mag. Nat. Hist., 7th ser., 2, p. 292 (Cairo).

1932. *Felis chaus*, S. S. Flower, Proc. Zool. Soc., p. 390.

Geographical Distribution.—Egypt, principally the Delta district, but extending westwards to Mersa Matruh, 155 miles west of Alexandria, and southwards along the Nile to the Fayoum, Quena Province and probably Minia Province (Flower).

Diagnosis.—Distinguished from *furax* by the colour being on the average darker, owing to the presence of more black speckling in the pelage, the colouring of the ears being about the same, and by the slightly smaller teeth.

Colour.—Individual variation in colour and length of the winter coat are not great. An adult ♂ from Giza (9.7.1.15), dated February 2, has the coat full, with the hairs on the flank 47 mm., on the crest 57 mm. The general colour of the flanks is grey, speckled black and whitish, of the fore back and shoulders buffy grey, of the spinal crest dull ochreous and black: the crown of the head is like the flanks; the ears behind are black at the tip and base, buff in the middle; the tail is like the back proximally, white distally with two black stripes and a black tip; the fore legs are pale buffy grey, the hind richer buff; the lower side is buffy with white in inguinal and axillary areas. The pattern both of the fore and hind limbs is obscure. An adult ♂ from near Cairo (98.6.5.2), January 29, has the coat similarly full, but not so long, the hairs on the flank being 39 mm., on the crest 48 mm. The colour differs slightly, the flanks are not quite so grey, showing a buffy tint; there is less black in the crest and the legs are rather richer tinted. A young ♀ from near Cairo (98.6.5.3), January 17, has the coat about the same length as in the last, but it is greyer in colour than either of the ♂♂ described, owing to the pale speckling of the flanks being whiter. Other skins in winter coat call for no special comment; but an undated skin labelled Egypt, without precise locality (42.5.3.8), appears to be in summer coat, the hair of the flanks being 28 mm., of the crest 36 mm.; and a ♀ skin from Akmin, 400 miles south of Cairo (Worthington, 92.5.22.1), March 2, is noticeably paler, more sandy and less black in colour than the foregoing, and has the winter coat shorter, the hairs on the flanks being 25 mm., on the crest 43 mm.

CRANIAL AND DENTAL MEASUREMENTS OF *FELIS CHAUS NILOTICA*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*pm^1*	*m_1*
			mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ ad.	Lower Egypt . .	42.5.3.8	131	120	82	35	22	33	16	10
♂ ad.	Giza, Cairo . .	9.7.1.15	133	120	88	36	22	33	15	10·5
♂ ad.	Near Cairo (type) .	98.6.5.1	132	117·5	82·5	37·5	22·5	32 +	15·5	10
♂ ad.	Assouan . . .	97.3.12.1	128	117	82	35	22	33	16	—
♂ vix ad.	Cairo . . .	19.7.7.3494	128	117	83	37	23	32	15	11·5
♂ yg. ad.	Near Cairo . .	98.6.5.2	121	110	78	37	21	31	15·5	11
♂ yg.	Near Alexandria .	99.7.15.1	114	106	74	39	19	28	14	10
♀ ad.	Akmin . . .	92.5.22.1	115	106	75	37	21	29	14	10
♀ yg. ad.	Near Cairo . .	98.6.5.4	106	97	70	34	19	26	13·5	9
♀ yg.	,, ,, . .	98.6.5.3	100	92	66	36	16	25	14·5	10

Flesh measurements and weights are as follows:

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*	*Weight*
			in.	in.	in.	in.	lb. oz.
♂ yg. ad.	Near Cairo . .	98.6.5.2	30⅝	11½	7	2⅝	14 3
♂ ad.	,, ,, (type)	98.6.5.1	28⅝	10⅝	6⅝	2⅜	11 2
♂ ad.	Giza . .	9.7.1.15	29	11½	7⅛	2⅛	—
♀ yg. ad.	Near Cairo . .	98.6.5.4	24⅝	8⅜	5⅛	2½	8 7
♀ yg.	,, ,, . .	98.6.5.3	20⅛	8⅜	5⅜	2⅜	8 0

These dimensions agree closely with those of *F. chaus furax*. The skull, also, as shown by the table opposite, is about the same size in the two, and the dentition is very similar, the average length of pm^4 in six ♂ skulls being 15·5 mm. and in three ♀ skulls 14 mm.; in the latter 1 mm. shorter than in *furax*. The average condylobasal length of the skull in four adult ♂♂ is 118½ mm.

Specimens in the Collection

♂	Lower Egypt	Purchased	42.5.3.8
♀	Akmin, 400 miles south of Cairo	F. S. Worthington [C & P]	92.5.22.1
♂ Mtd.	Assouan	Dr. John Anderson [C & P]	97.3.12.1
♂	Near Cairo	R. J. Cunningham [C & P]	98.6.5.1 (type)
♂, 2 ♀	,, ,,	,, ,, ,,	98.6.5.2–4
♂ skull, 1	Cairo (Walter Innes)	F. Lataste [P]	19.7.7.3494–5
♂	Giza, Cairo	J. L. Bonhote [C & P]	9.7.1.15
♂ skull	Near Alexandria	Major S. S. Flower [C & P]	99.7.15.1
♂ skull	Near Cairo? (E. Alexander)	R. I. Pocock [P]	1937.12.11.4
♀	Nag-Ayed, Tuftish Farshout	Rothschild Bequest	39.1688

Felis chaus affinis, Gray

1830. *Felis affinis*, Gray, Illustr. Ind. Zool., 1, pl. 3 (Gangootri, Tehri Garwhal).
1836. *Felis (Lynchus) erythrotus*, Hodgson, Journ. As. Soc., Beng., 5, p. 233 (Nepal).
1844. *Felis jacquemonti*, Geoffroy, Jacquemont's Voyage, 4, p. 58, pls. 2–3 (Kursali, near Dehra Dun).
1898. *Felis chaus affinis*, de Winton, Ann. Mag. Nat. Hist., 7th ser., 2, p. 291 (in part).
1914. *Felis affinis*, Wroughton, Journ. Bomb. Nat. Hist. Soc., 23, p. 290, and subsequent papers on Himalayan collections in the same journal (in part).
1939. *Felis chaus affinis*, Pocock, Mamm. Brit. India, 1, p. 294.

Geographical Distribution.—The Himalayas from Kashmir to Sikkim, and probably to the Naga Hills, Assam, at altitudes ranging from about 1,000 to 7,600 ft., perhaps over.

Diagnosis. Distinguished from typical *F. chaus chaus* by the slightly shorter and less woolly winter coat and by the smaller size on the average of the skull and teeth in both sexes.

Colour. In the winter coat the contour hairs of the flanks range from about 36 to 42 mm., of the crest from 58 to 60 mm., the average of six skins from Kumaun, September to March, and of six from Kuwapany, in Nepal, December to March, being 39 and 59 mm. respectively. There are two extreme, but intergrading, colour phases, the "grey" and the "tawny". In the former the grey of the flanks is paler or darker in accordance with the dominance of the black or white speckling in the pelage; the spinal stripe is speckled black and dull ochreous or buff; the cheeks, muzzle and legs are externally greyish, and the under side is dominantly white, apart from buff on the chest as a rule and a buff band on the throat. In the tawny phase the speckling on the flanks is black and buff or pale ochreous, of the spinal stripe black and rusty; the ears, cheek, muzzle, and sometimes the whole of the under side, except the white chin, are brighter or duller ochreous.

Skins of a handsome blackish variety have been collected in the United Provinces (St. G. Burke). They differ a little individually, but the finest of three has the head, the spinal area behind the shoulders jet-black and the legs and tail mostly black, but the neck and sides of the body are black, thickly spangled with silvery white, and the under-hair is mostly ashy grey, but smoke grey on the crest. They resemble a similar form assigned to *F. chaus prateri* from Karachi (p. 170).

Measurements and Weights

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Weight*
			m.	m.	in.	lb.
♂ ad.	Tral, Kashmir	25.6.10.12	27½	11⅜	6¼	19
♂ ad.	Dhamtal, Kangra	32.2.1.24	26⅝	8⅝	6	—
ad.	Gopalpur, Kangra	32.2.1.23	24⅜	9½	5	12
♂ ad.	Almora, Kumaun	14.7.10.57	25½	11⅝	6½	12¼
♂ ad.	Ramnagar, Kumaun	32.2.1.17	25	11½	6½	16
♂ ad.	Kuwapany, Nepal	32.2.1.12	28⅝	13½	6½	16
♂ ad.	,, ,,	32.2.1.13	26	11½	6⅝	12
♂ ad.	Gangtok, Sikkim		27¼	13¾	5½	—
ad.	Arapul, Kashmir	32.2.1.20	25⅝	10⅝	6¼	14
ad.	Gopalpur, Kangra	23.2.1.21	24	9	5⅝	—
ad.	Almora, Kumaun	14.7.10.58	23½	11½	5½	11½
ad.	Kuwapany, Nepal	32.2.1.11	24⅝	10	6	10½
ad.	Hathiban, Nepal	32.2.1.3	22¼	11⅜	5⅓	11
ad.	Darjeeling	32.2.1.15	25⅜	10¼	6	—

The average length of the ear is a trifle under 3 inches. An adult ♀ from Khatmandu (Oldfield), of which the skull measurements are entered in that table, weighed 16 lb.

SKULL MEASUREMENTS OF ♂ SPECIMENS OF *FELIS CHAUS AFFINIS*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Mand. length*	pm^1	m_1
♂ ad.	Kashmir	18.2.2.1	127	113	84	35	22	31	85	13	11
♂ ad.	Tral, Kashmir . . .	25.6.10.12	119	107	80	35	22	30	78	12	10
♂ yg. ad.	Dhamtal, Kangra Valley .	32.2.1.24	112	102	72	35	18	25	73	12	10·5
♂ yg. ad.	Dharmsala	25.10.2.1	111	102	73	35	18	26	73	12	9·5
♂ ad.	Garhwal	29.10.19.1	120	106	75	35	21	27	78	12	10
♂ ad.	,, ...	26.10.8.25	120	107	75	36	20	27	80	13	9·5
♂ ad.	,, ...	26.10.8.23	112	103	74	34	19	27	75	13	10·5
♂ ad.	Almora, Kumaun . .	14.7.10.57	117	108	76	38	20	27	78	15	10
♂ ad.	Ramnagar, Kumaun . .	32.2.1.17	116	106	75	32	20	27	78	13	10
♂ ad.	Kuwapany, Nepal . .	32.2.1.8	120	107	80	36	22	28·5	77	13	10·5
♂ ad.	Bankalwa, Nepal . . .	22.5.16.28	117	106	79	34	20	27	79	12	10
♂ yg. ad.	,, ,, . . .	22.5.16.27	112	103	73	35	19	27	72	13	10
♂ yg. ad.	Hathiban, ,, . . .	32.2.1.1	112	104	75	32	17	25	76	12	10
♂ ad.	Gorakpur, United Provinces .	29.10.19.2	115	105	77	34	18	27	76	12·5	10·5
♂ ad.	Hasimara, Bhutan Duars .	32.2.1.16	118	106	78	32	19	28	78	12	10
♂ ad.	Kuiva, Naga Hills . .	25.5.2.1	113	105	74	35	20	27	75	11	9

Skull.—The first ♂ skull on the list is interesting on account of its large size, all of its dimensions agreeing tolerably closely with those of typical *chaus* and exceeding, for the most part, those of the other Himalayan skulls. The length, on the contrary, of pm^1 is a good deal less than in typical *chaus*, and agrees completely with that of the rest of the Himalayan ♂♂. In those respects it is a connecting link between the two races. The average condylobasal length in ten adult ♂♂ of *affinis* is 107·5 mm. and the average length of pm^1 is 12·5 mm., both noticeably less than in typical *chaus*, and the average length of the bulla in sixteen ♂ skulls is 21·5 mm. The same dimensions in eight adult ♀ skulls are: 96+, 12+, and 20+ mm.

The great difference in size between the ♀ skull from Khatmandu (Oldfield) and the one from the Bhaber Tract, Central Nepal (Longstaff), is interesting. The latter, an older skull, has the bullae more inflated and is one of the smallest ♀ skulls of *F. chaus* yet measured.

Specimens in the Collection

♀	Trol, Kashmir	Col. C. H. Stockley [C & P]	25.6.10.12
	Arapul Valley, Kashmir	,, ,,	32.2.1.20
♀ skull	Kashmir	C. P. Radcliffe [C & P]	18.2.2.1
3 ♂ ,,	Gopalpur, Kangra (H. W. Wells)	Bombay Nat. Hist. Soc. [P]	32.2.1.21–23
♀	Dhamtal, Kangra (H. W. Wells)	,, ,,	32.2.1.24
	Mandi State	H. Whistler [C & P]	25.10.2.2
♀	Dharmsala	,, ,,	25.10.2.1
	,, (H. W. Wells)	Bombay Nat. Hist. Soc. [P]	23.9.2.1
1	Gangootri, Tehri Garhwal	Maj.-General Hardwicke	37.6.10.41 co-type
1	Dehra Dun	Capt. F. S. Tuker [C & P]	26.9.4.3
4 ♂ skulls	Garwhal	B. B. Osmaston [C & P]	26.10.8.23–26
♂	,,	A. E. Osmaston [C & P]	29.10.19.1
1	Kumaun (Sir R. Strachey)	Sec. of State for India [P]	79.11.21.286
	Khati, Kumaun (C. A. Crump)	Bombay Nat. Hist. Soc. [P]	32.2.1.19
♂	Ramnagar, ,, ,, ,,	,, ,,	32.2.1.17–18
	Dela, ,, ,, ,,	,, ,,	14.7.10.59
♀	Jerna, ,, ,, ,,	,, ,,	14.7.10.60
♂	Lohaghat, Almora ,, ,,	,, ,,	14.7.10.57–58
3	United Provinces (black silver-tipped variety)	R. St. George Burke [C & P]	27.2.14.11,14,15
♀	Gorakpur, United Prov.	A. E. Osmaston [C & P]	29.10.19.2
1	Nepal	B. H. Hodgson [P]	45.1.8.287
skull	,,	Mrs. M. Oldfield [P]	26.6.7.3
	Bhaber Tract, Central Nepal	Dr. T. G. Longstaff [C & P]	10.2.24.2
2 ♂, 2 ♀	Hathiban, Nepal (N. A. Baptista)	Bombay Nat. Hist. Soc. [P]	32.2.1.1–4
2 ♂, 7 ♀	Kuwapany, Nepal	,, ,,	32.2.1.5–13
	Hazaria, Pathergatta, Nepal	,, ,,	32.2.1.14
♂	Bankalwa, Morang, Nepal	,, ,,	22.5.16.27
♂	,, ,, ,,	,, ,,	22.5.16.28
Skull	Gangtok, Sikkim	Col. F. M. Bailey [C & P]	48.220
	Nimbong, Darjeeling (N. A. Baptista)	Bombay Nat. Hist. Soc. [P]	32.2.1.15
	India (Dr. Anderson)	Zool Soc. [P]	30.675

♂	Hasimara, Bhutan Duars (N. A. Baptista)	Bombay Nat. Hist. Soc. [P]	32.2.1.16
ı	Assam? (J. McClelland)	Sec. of State for India [P]	79.11.21.287
♂	Khuiva, Naga Hills (J. P. Mills)	Bombay Nat. Hist. Soc. [P]	25.5.2.1

Felis chaus kutas, Pearson

1832. *Felis kutas*, Pearson, Journ. As. Soc. Beng., 1, p. 75 (Midnapore, in Bengal, about 70 miles west of Calcutta).
1939. *Felis chaus kutas*, Pocock, Mamm. Brit. Ind., 1, p. 297.

Geographical Distribution.—The northern part of Peninsular India from Bengal to Cutch, and ranging in altitude from 1,500 ft. in Darbhanga, north of the Ganges, to 150 ft. in Cutch.

Diagnosis.—Distinguished from the Himalayan race *affinis* by being, on the average, a little smaller, shorter in the tail, lighter in weight, and by its shorter and less luxuriant winter coat, although seasonal differences in the coat are well marked. In six adult examples from Hoshangabad in full winter coat the average length of the hair on the flanks is 37 mm., on the spinal stripe 50 mm. The skull and teeth are also, on the average, a little smaller than in *affinis*.

Colour.—The general colour is individually and locally variable. The type, judging from its description, was dark-tinted. A topotype from Salbani, Midnapore, in fresh winter coat is also very blackish speckled with buffy grey above, with the spinal stripe rusty, the ears ochreous brown with black at the tip and base, the lower side, except for the white fore throat, axillae and groins, being reddish buff. Most of the specimens found west of Midnapore are not so dark, being tawnier or greyer, and in the western portions of its range, in Rajputana, the race intergrades with the Sind race *prateri*.

Measurements and Weights

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Weight*
			in.	in.	in.	lb.
♂ yg.	Midnapore	15.4.3.60	22⅜	10⅛	6	8½
♂ ad.	Chaibassa	15.4.3.59	22⅜	9⅜	5⅜	11
♂ ad.	Dhain, Hoshangabad	12.11.29.75	25⅛	10¼	6	8½
♂ ad.	Nokania, Cutch	12.6.27.18	25⅛	9⅝	6	11½
♂ ad.	Kishunghar	85.8.1.19	28	11	6¼	12½
♂ ad.	Mount Abu	13.9.18.37	23½	10	6	13
♀ ad.	Hazaribagh	15.4.3.61	21⅛	9⅛	5⅜	6¼
♀ ad.	Bori, Hoshangabad.	12.11.29.76	22⅛	9⅛	5¼	7¼
♀ ad.	Bhuj, Cutch	12.6.27.15	23⅜	10	5½	8
♀ ad.	Charwa, Cutch	32.2.1.46	22	10½	—	5¾

SKULL MEASUREMENTS OF ♀ EXAMPLES OF *FELIS CHAUS KUTAS*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Mand. length*	*pm*^{1}	*m*$_1$
♀ ad.	Darbhanga	32.2.1.29	115	103	77	32	18	26	76	13	10
♀ ad.	,,	32.2.1.28	107	98	76	33	18	27	70	12·5	9
♀ sub.ad.	Chaibassa	15.4.3.59	107	100	76	36	19	26	72	12·5	10
♀	Hazaribagh	56.5.6.22	113	101	76	35	20	26	73	12	9
♀ yg. ad.	,,	32.2.1.32	108	97	71	33	17	25	71	12	9
♀ ad.	Sehore, C.I.	10.12.2.13	115	103	78	36	22	27	76	12	10
♀ ad.	Dhain, Hoshangabad	12.11.29.75	116	105	77	35	22	30	77	12	9·5
♀ ad.	Shendurni, Khandesh	11.12.21.11	114	102	74	32	20	27	74	12	9·5
♀ ad.	Deesa, Gujerat	32.2.1.34	—	111 +	83	35	23	32	82	13	10·5
♀ ad.	Charwa, Cutch	12.6.27.17	118	106	78	32	20	28	79	14	11
♀ ad.	Nokania, Cutch	12.6.27.18	114	102	75·5	33	20	28	75	12	10
♀ ad.	Kishunghar, Rajputana	85.8.1.19	118	106	76	34	19	28	77	12	10
♂ ad.	Mount Abu, Rajputana	13.9.18.37	111	101	76	35	20	26	75	12	9
♀ yg. ad.	Salt Range, Punjab	1172a	112	103	72	33	18	28	73	11	9

Skull.—The skull and teeth are, on the average, a trifle smaller than in *Felis chaus affinis*. In eleven adult ♂ skulls the average length of the condylobase is 103·5 mm., of the bulla 20 + mm., and of pm^4 12 + mm. The same dimensions in fifteen adult ♀ skulls are: 92·5 mm., 20 mm., and 11·5 mm. The ♂ skulls agree closely with those of the ♀ skulls of *affinis*.

As recorded in the case of *affinis*, one ♂ skull of *kutas* stands out from the rest for its exceptional size. It is labelled Palanpur, Gujerat, and has the occipital region imperfect. I estimate, however, that it would have been about 111 mm., in condylobasal length, exceeding by 3 mm. the largest recorded in *affinis*, apart from the first on the list from Kashmir. Its mandible at all events is longer than any recorded under *affinis*.

An interesting individual variation is shown by one of the ♂ skulls from Darbhanga, in Bahgownie (32.2.1.26). The mesopterygoid fossa in the middle of its length is 17 mm. wide, the ectopterygoid spines are 25 mm. from tip to tip, and the presphenoid is 8·5 mm. wide. The skull is not quite so big in other respects as the first on the list (32.2.1.29), but in the latter those three dimensions are respectively 14, 18, and 6·5 mm.

Specimens in the Collection

♂	Salbani, Midnapore, Bengal (C. A. Crump)	Bombay Nat. Hist. Soc. [P]	15.4.3.60
1	Singar, Gaya, Behar and Orissa (C. A. Crump)	Bombay Nat. Hist. Soc. [P]	32.2.1.33
♂	Koira, Chaibassa, Orissa (C. A. Crump)	,, ,,	15.4.3.59
♂	Jagodib, Hazaribagh, Orissa (C. A. Crump)	,, ,,	15.4.3.61 32.2.1.32
5 ♂ ♀	Bahgownie, Darbhanga, Orissa (N. A. Baptista)	,, ,,	32.2.1.25–30
♂	Banhar, Darbhanga, Orissa (N. A. Baptista)	,, ,,	32.2.1.31.
1	Etah, United Provinces	W. B. Cotton [C & P]	7.3.22.1
1	Jhelum, Punjab	Capt. C. H. T. Whitehead [C & P]	5.10.8.8
♂	Toupi, North-west Punjab	Col. C. H. Stockley [C & P]	32.2.1.52
♂	Kishunghar, Rajputana (R. M. Adam)	A. O. Hume [P]	85.8.1.19
♂	Sambhar, ,, ,, ,,	,, ,,	85.8.1.18
♂	Mt. Abu, ,, (C. A. Crump)	Bombay Nat. Hist. Soc. [P]	13.9.18.37
♂	Bhoria, ,,	Major H. N. Dunn [C & P]	10.1.18.32
♀	Morar, Gwalior, Central India (C. M. Primrose)	Bombay Nat. Hist. Soc. [P]	32.2.1.50
2 ♀	Agar Malwa, Gwalior (J. R. O'Brien)	,, ,,	32.2.1.47–8
♀	Binaganj, ,, ,,	,, ,,	32.2.1.49
♂	Rothiai, ,, ,,	,, ,,	32.2.1.51
♂	Sehore, Central India	Capt. C. H. T. Whitehead [C & P]	10.12.2.13
♀	Sehore, ,, ,,	O. O. Curtis [C & P]	10.12.2.14
♂	Sarangpur, Hoshangabad, Central Province	A. A. Dunbar Brander [C & P]	11.1.16.8,9
2 ♂	Dhain, Hoshangabad, Central Prov. (C. A. Crump)	Bombay Nat. Hist. Soc. [P]	12.11.29.75 32.2.1.40

♀	Bori, Hoshangabad, Central Prov. (C. A. Crump)	Bombay Nat. Hist. Soc. [P]	12.11.29.76
♂	Sakok, Hoshangabad, Central Prov. (C. A. Crump)	,, ,,	12.11.29.74
♂	Pachmarhi, Hoshangabad, Central Provinces (C. A. Crump)	,, ,,	32.2.1.39
♂	Mundra, Saugor, Central Provinces (C. A. Crump)	,, ,,	32.2.1.37
1	Central Provinces	Marquis of Ripon	82.4.3.1
2	,, ,, ?	,, ,,	82.12.4.3 83.10.5.2
♂	Garoor, Nimar (C. A. Crump)	Bombay Nat. Hist. Soc. [P]	32.2.1.41
2 ♀	Asirgarh, ,, ,, ,,	,, ,,	32.21.42–3
♂ ♀	Hewra, ,, ,, ,,	,, ,,	12.6.28.11–12
♀	Ghodasgaum, E. Khandesh (C. A. Crump)	,, ,,	11.12.21.13
2 ♂, 1 ♀	Shendurni, E. Khandesh (C. A. Crump)	,, ,,	11.12.21.11–12 32.2.1.71
♀	Edalabad, E. Khandesh (C. A. Crump)	,, ,,	32.2.1.45
♀	Fardapur, Ajanta, Hyderabad (C. A. Crump)	,, ,,	32.2.1.38
♂	Lunwa, Palanpur, Gujerat (C. A. Crump)	,, ,,	13.9.18.36
♂	Deesa, Palanpur, Gujerat (C. A. Crump)	,, ,,	32.2.1.34
♀	Charwa, Cutch (C. A. Crump)	,, ,,	32.2.1.46 12.6.27.17
♀	Bhuj, ,, ,, ,,	,, ,,	12.6.27.15
♀	Chitrod, ,, ,, ,,	,, ,,	12.6.27.16
♂	Nokania, ,, ,, ,,	,, ,,	12.6.27.18
♂	Rajkot, Kathiawar (C. A. Crump)	Bombay Nat. Hist. Soc. [P]	13.8.8.40 32.2.1.72
♀	Junagadh, ,, ,, ,,	Bombay Nat. Hist. Soc. [P]	13.8.8.41
3 ♂	Near Poona	G. L. McGregor [C & P]	10.10.28.1–3

Felis chaus prateri, Pocock

1939. *Felis chaus prateri*, Pocock, Mamm. Brit. India, 1, p. 298, and 2, Appendix, p. 480 (Jacobabad, on the Upper Sind Frontier).

Geographical Distribution.—Sind, from the Upper Sind Frontier, Larkana and Karachi in the west to Thar Parkar in the south-east.

Diagnosis.—Intergrading in Rajputana, Cutch, and other districts to the east with typical *F. chaus kutas* from Bengal; but distinguished on the average by its paler, more uniformly, sandy or tawny hue at all seasons of the year, and by its slightly larger skull. Distinguished also from typical *chaus* from Persia, but no doubt intergrading with it, in its more tawny, less grey general colour and by the smaller size of the skull and teeth.

Colour.—The winter coat is not nearly so full and soft as in the Himalayan race *affinis*, but is about the same as in *kutas*, the hair on the flanks varying from 25 to 34 mm. and on the spinal crest from 45 to 55 mm. The general colour varies a good deal individually from dull greyish buffy tawny to richer,

SKULL MEASUREMENTS OF *FELIS CHAUS PRATERI* FROM SIND

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Mand. length*	*pm^1*	*m_1*
♂ ad.	Jacobabad . . (type)	32.2.1.67	120	108	79	34	21	28	79	12	10
♂ ad.	,, . . .	15.11.1.67	117	106	80	34	23	29	80	12	10·5
♂ ad.	Chachro, Thar Parkar . .	43.101	118	108	79	35	22	28	78	12	9
♂ ad.	,, ,, ,, . .	43.99	116	104	78	37	20	27	75	12	10
♂ ad.	,, ,, ,, . .	43.98	115	105	75	35	18	25	75	13	10·5
♂ ad.	Umarkot ,, ,, . .	43.72	118	107	74	34	21	29	75	13·5	11
♂ ad.	,, ,, ,, . .	43.73	115	107	74	34	20	26	76	12	9
♂ ad.	,, ,, ,, . .	43.67	114	103	79	34	20	27	75	12	11
♂ ad.	Pano Aquil ,, ,, . .	43.102	114	103	75	33	19	28	—	12	—
♂ ad.	,, ,, ,, ,, . .	43.103	—	—	78	33	21	28	78	12	9
♂ ad.	Karachi	99.11.10.1	113	100	74	34	18	26	72	13	10
♀ ad.	Naundero	15.11.1.68	106	97	68	34	18	24	71	11·5	9
♀ ad.	Chachro, Thar Parkar . .	43.100	107	98	71	36	19	24	71	12	10
♀ ad.	Umarkot ,, ,, . .	43.75	107	97	69	34	18	—	70	11	10
♀ ad.	Thar Parkar District . . .	43.105	103	93	70	—	17	24	69	11·5	8·5

more ochreous tawny, the spinal stripe correspondingly varying from duller ochreous to rusty ochreous. In paler specimens the black speckling in the coat is less conspicuous. There may be a median black stripe down the tail; otherwise the pattern is normal on the limbs and tail, the ears varying from rusty ochreous, with the tip extensively black, to much duller. One skin from Thar Parkar is brighter and redder than the average, thus approaching typical *kutas*, and some of the skins from Rajputana, assigned to *kutas*, intergrade in colour with *prateri*; but typical *kutas* from Midnapore and other parts of Bengal is more richly and heavily pigmented than *prateri*.

An aberrant skin from Karachi, mostly black, but with silvery tips to the hairs in parts, is very similar to the blackish variety of *affinis* from the United Provinces (p. 162). The under-hair is everywhere clear whitish grey, but the contour hairs are jet-black on the backs of the ears, the crown, part of the spinal area, most of the tail, the backs of the legs and the feet, but the black of the cheeks, forehead, neck, shoulders, flanks, lower side, root of the tail, and front of the forelegs is relieved by conspicuous silvery speckling.

Measurements and Weights

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Weight*
			m.	m.	in.	lb
♂ ad.	Jacobabad . . (type)	32.2.1.67	29	10	6	20
♂ ad.	,, ...	15.11.1.67	27½	12⅝	6	—
♂ ad.	,, ...	37.3.24.18	27½	10½	5⅛	14
ad.	Larkana	15.11.1.68	23	10½	5⅛	—
yg.	Gholam	32.2.1.69	23	9½	5⅝	—

Skull.—The skull shows no peculiarities. It is a little larger than in *kutas*, the average condylobasal length in nine adult ♂♂ being 106 mm. It is 103 mm. in eight adult ♂♂ of *kutas* ranging from Bengal to Rajputana, but in approximately topotypical examples from Bengal the average is only 101½ mm. The teeth are the same size in the two races, the average length of pm^4 being alike, 12½ mm. The skull is smaller, on the other hand, than that of *chaus* from Persia, in which the average condylobasal length in one adult and two subadult ♂♂ is 111 mm. The teeth, too, are smaller, the average length of pm^4 in four ♂♂ of *chaus* being 14½ mm. Similar differences occur in . skulls.

Specimens in the Collection

	Jacobabad, Upper Sind (S. H. Prater)	Bombay Nat. Hist. Soc. [P]	32.2.1.67 (type)
2	Jacobabad, Upper Sind (S. H. Prater)	,, ,,	15.11.1.67 32.2.1.68 37.3.24.18
2	Naundero, Larkana, Sind (S. H. Prater)	,, ,,	15.11.1.68 32.2.1.70

♀	Gholam, Sind (C. McCann)	Bombay Nat. Hist. Soc. [P]	32.2.1.69
1	Karachi (melanistic variety)	,, ,,	99.11.10.1
2 ♂, 2	Umarkot, Thar Parkar Dist., Sind (W. J. C. Frost)	Sir J. Ellerman [P]	43.67–71
2 ♂, 4 skulls	Umarkot, Thar Parkar Dist., Sind (W. J. C. Frost)	,,	43.72–7
4 ♂ skulls	Chachro, Thar Parkar Dist., Sind (W. J. C. Frost)	,,	43.98–101
2 ♂	Pano Aquil, Thar Parkar Dist., Sind (W. J. C. Frost)	,,	43.102–3
2 ♂, 1	Thar Parkar Dist., Sind (W. J. C. Frost)	,,	43.104–6
19 skins	Thar Parker Dist., Sind (W. J. C. Frost)	,,	43.78–97

Felis chaus kelaarti, Pocock

1852. *Felis chaus*, Kelaart, Prodr. Faun. Zeyl., p. 48 (Cheddikulam, N.P., Ceylon).

1935. *Felis affinis*, Phillips, Man. Mamm. Ceylon, p. 160 (not of Gray).

1939. *Felis chaus kelaarti*, Pocock, Mamm. Brit. India, 1, p. 300.

Geographical Distribution.—Ceylon and South India, south of the Kistna River, up to about 5,000 ft.

Diagnosis.—Distinguished from *kutas* and *affinis* by the coat at its best being shorter and less luxuriant and exhibiting very little seasonal difference in thickness and length. In seven adult skins collected between December and March the average length of the hairs on the flanks and crest is about 10 mm. less than the average in *kutas* in the same months. The general tint is also slightly different owing to the finer speckling on the shorter hairs.

Colour.—In a large series of Indian skins from widely separated localities, taken at different altitudes and collected at different times of the year, the colour of the upper side is very uniform, grey owing to the blend of black and nearly white speckling, with the spinal stripe largely ochreous; the backs of the ears are mainly rusty or ochreous, with a very variable amount of black at the tip and base; the legs are typically rich ochreous and the under side has a varying amount of buff on the chest. The pattern is just traceable high up on the flanks, stronger lower down; there are blackish or buff spots on the chest and the legs are normally striped. Rather exceptional in colouring are a skin from Dharwar (Shortridge), October, which has a buff cast and is not so grey, one from Haleri, North Coorg (Shortridge), which is the darkest grey of all and has most black on the ears, and two from Kurnool (Baptista), which have the legs greyish buff.

There are two skins only from Ceylon. The type from Cheddikulam, N.P. (E. W. Mayor, 32.2.1.66), is a young adult ♂ closely resembling typical Indian skins, with the general colour darkish ashy grey on the flanks, the well-defined spinal crest black and ochreous, the crown blacker than the flanks, the ears reddish ochreous with some black at the base and a considerable amount at the tip, the fore legs rich buff externally, the hind paler, the metatarsus rufous behind almost to the plantar pad, the upper lip, chin and fore throat white,

the hind throat buff, the chest and belly faintly buff and the axillae and groin white. The pattern is represented by the usual stripes on the tail, strong stripes on the hind legs above the hocks outside, and fairly strong on the fore legs with two well-developed brachials, faint spots on the belly and some just traceable on the flanks.

The second specimen from the low country between Colombo and Kandy (Whyte, 77.11.1.2), an adult ♂, is very different, the general colour, being much darker, brownish grey, the dorsal area being extensively black, with faint buff speckling, and the spinal stripe hardly defined; the ears reddish with black tip and base; the hind throat and chest much more richly buff, and hardly any white on the axillae, groin and inner side of the legs; the limbs are strongly striped externally and internally in the upper part, the belly is strongly spotted, and there are conspicuous short vertical stripes all down the flanks and especially strong just behind the shoulders. But apart from the greater distinctness of the pattern, the general colour is only a shade darker than in the skin from North Coorg, above referred to, and in one from the Nilgiri Hills (Phythian Adams).

From the differences between this skin and the other examples assigned to *kelaarti*, especially in the distinctness of the pattern on the flanks, and from Phillips's remark that the Jungle Cat in Ceylon is confined to the northern dry zone, I suggested (*Mamm. Brit. India*, 1, p. 304, 1939) that this skin collected by Whyte might be a hybrid between *F. chaus* and a feral domestic cat; but the large size of the skull and teeth hardly supports this idea.

The dimensions of the adult examples in this table show close agreement with those of the more northern race *F. chaus kutas*. The last two on the list,

Measurements and Weights

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*	*Weight*
				in.	in.	in.	lb.
♂ ad.	Kurnool . . .	32.2.1.58	25 1/2	10 1/2	6 1/2	2 1/2	12
♀ ad.	,, . . .	32.2.1.59	24 5/8	10 3/8	5 3/4	2 3/4	11 1/2
♂ yg. ad.	Vontimitta Range .	32.2.1.60	24 1/8	10 1/8	6	2 1/8	11
♂ ad.	Kanara . . .	32.2.1.63	24 5/8	12 1/8	6	2 1/2	13
♂ yg. ad.	Dharwar . . .	12.6.29.42	24 5/8	11 1/8	6	2 1/8	—
♀ ad.	,, . . .	12.6.29.43	24	10 1/8	5 1/2	2 1/8	—
♀ yg. ad.	,, . . .	32.2.1.62	22 3/8	9 1/8	5 1/8	2 1/8	—
♀ ad.	North Coorg . .	32.2.1.65	25	9	—	2 3/8	—
♀ ad.	Palni Hills . .	32.2.1.64	24 3/8	10	5 3/8	3 1/8	8
♂ yg.	Salem . . .	30.5.24.110	16 3/8	7 1/8	4 3/8	2 1/8	3 1/2
♂ yg.	Travancore . .	32.2.1.74	12	6 3/8	3 1/8	2 3/8	—
♂ yg. ad.	Cheddikulam, Ceylon (type)	32.2.1.66	23	7 11/16	5 1/8	2 1/8	8

The tail is entered as 183 mm., which is exceptionally short. On the skin, as made up, it is 7 inches; but the head and body are about 23 inches and the hind foot 5 1/2 inches, and since these agree very closely with the flesh measurements, it does not seem probable that the tail has been appreciably stretched.

SKULL MEASUREMENTS OF *FELIS CHAUS KELAARTI*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Mand. length*	pm^4	m_1
♂ ad.	Between Colombo and Kandy	77.11.1.2	120	109	77	33	21	29	77	13	10
♂ ad.	Kurnool	32.2.1.59	115	103	78	32	19	27	74	12·5	8·5
♂ ad.	,, ...	32.2.1.58	116	105	75	33	20	28	76	13	11
♂ yg. ad.	Dharwar	12.6.29.42	110	100	71	33	19	26	72	12	9
♂ yg. ad.	Vontimitta Range . .	32.2.1.60	110	98	69	31	18	25	70	12	9
♂ yg.	Kanara	32.2.1.63	107	97	69	34	17	24	70	11	9
♀ ad.	Kurnool	—	103	90	67	34	18	24	67	12	9
♀ ad.	Palni Hills	32.2.1.64	105	98	66	33	17	23	70	11·5	9
♀ ad.	Nilgiri Hills . . .	88.2.5.18	101	94	65	33	15	22	67	11	8·5
♀ ad.	Dharwar	12.6.29.43	98	90	66	34	18	23	64	11	9
♀ ad.	,, ...	32.2.1.62	97	88	70	35	17	22	64	12	9
♀ ad.	North Coorg . . .	32.2.1.65	101	93	70	33	18	24	64	11	9
♀ ad.	Travancore	32.3.3.2	101	95	68	30	18	24	68	11	9
♀ yg. ad.	South-west Mysore . .	5.10.8.8	100	92	63	35	15	25	66	12	—

both quite young, show that the ear attains its full length at a comparatively early age and is therefore relatively larger than in the adult. The older of the two from Salem has acquired the coloration of the adult and lost its juvenile stripes on the flanks; but the younger, a half-grown kitten, from Travancore, still retains on the flanks a well-defined pattern of vertical stripes, particularly well pronounced just behind the shoulder.

Skull.—The upper part of the young skull of the type from Cheddikulam, N.P., is not available, but the mandible is 66 mm. long and has the unworn m_1 10 mm. The adult skull of Whyte's specimen is a little longer than the longest adult ♂ skulls from Kurnool, on the mainland, and differs from the skulls of all the races of *F. chaus* in the height of the crown, which has the frontal sinuses much more strongly inflated than usual. Also, the mesopterygoid fossa is exceptionally narrow, only 13 mm., 2 mm. narrower than in the young adult ♂ from Dharwar (12.6.29.42), which is 9 mm. shorter in condylobasal length, and 3 mm. narrower than in the larger of the two ♂ skulls from Kurnool, which is 4 mm. shorter in total length. The palate is correspondingly narrower. These deviations from the normal are difficult to explain on the hypothesis that this cat is a hybrid between *F. chaus kelaarti* and a feral example of the striped variety of *F. catus*, which has a much shorter and relatively broader skull than *F. chaus*. If it is such a hybrid the cranial and dental characters of *F. chaus* are dominant. The Indian skulls of *kelaarti* do not differ appreciably from those of the more northern race *kutas*. It may be noted that the degree of inflation of the bullae differs a good deal in the two ♂ skulls from Kurnool. In the first the length is 21 mm., in the second 23 mm., and the height differs accordingly.

Specimens in the Collection

♀	Malakondapenta, Kurnool, Madras Pres. (N. A. Baptista)	Bombay Nat. Hist. Soc. [P]		32.2.1.58
♂	Diguvametta, Kurnool, Madras Pres. (N. A. Baptista)	,,	,,	32.2.1.59
♂	Madhavaram, Vontimitta Range (N. A. Baptista)	,,	,,	32.2.1.60
♀	Tirthamalai, Salem, Madras Pres. (N. A. Baptista)	,,	,,	30.5.24.110
	Shevaroy Hills (Daly)	W. T. Blanford [P]		91.10.7.13
2 ♂♂	Dharwar, Madras Pres. (G. C. Shortridge)	Bombay Nat. Hist. Soc. [P]		12.6.29.42–43
				32.2.1.61–2
♀	Hulekal, North Kanara (G. C. Shortridge)	,,	,,	32.2.1.63
♀	Jhelum, South-west Mysore			5.10.8.8
2	Nilgiri Hills	Major Phythian Adams [C & P]		37.1.10.4–5
♀	Snowdon, Nilgiri Hills	W. Davison [C & P]		88.2.5.18
♂	Haleri, N. Coorg (J. C. Graham)	Bombay Nat. Hist. Soc. [P]		32.2.1.65
♂	Perumal, Palni Hills (C. McCann)	,,	,,	32.2.1.64
♂	Bheemanagari, Travancore (R. S. Pillay)	,,	,,	32.2.1.74
♀	Trivandrum?—died in Zool. Gdns.			32.3.3.2

♂	Cheddikulam, N.P., Ceylon (E. W. Mayor)	Bombay Nat. Hist. Soc. [P]	32.2.1.66 (type)
♂	Between Colombo and Kandy ? hybrid with domestic cat [*vide* Mamm. Brit. India, 1, p. 304, 1939]	A. Whyte [C & P]	77.11.1.2

Felis chaus fulvidina, Thomas

1928. *Felis affinis fulvidina*, Thomas, Proc. Zool. Soc., p. 834 (Kampong Tomb, Annam).

1939. *Felis chaus fulvidina*, Pocock, Mamm. Brit. India, 1, p. 303.

Geographical Distribution.—Annam and probably Burma, up to 5,000 ft. in the Chin Hills.

Diagnosis.—According to the skin of the type, the only certainly known representative of the race, *fulvidina* is distinguished from the previously described races of *F. chaus* by its more uniformly brightly ochreous colour above and below, and by the absence of contrast in tint between the backs of the ears, which are duller and have a very small black tip, and the rest of the upper side.

Colour.—The mid-winter coat (December 15) has the hairs of the flanks about 35 mm., of the crest about 50 mm., and the under-wool is not abundant. The colour is as described above, the contour hairs of the flanks lacking almost all the trace of the grey speckling observable in many skins of the other races, and the under side is rather more buffy, the hairs of the axillary and inguinal regions being whitish only at the base. The legs are whitish internally, the lips, chin and fore throat are normally white and the distal end of the tail is, as always in the species, banded black and grey. Otherwise the pattern is practically suppressed apart from faint trace of bands on the legs and the uniform blackness of the hind foot from the sole to the hock behind.

When Thomas described this race he was clearly quite unacquainted with the range in variation of colour exhibited in the same locality by the previously described races of *Felis chaus*, there being in most cases a grey phase and a fulvous phase. In reality the type of *fulvidina* can be matched very closely in general hue with skins from as far west as Sind.

To this race are provisionally assigned some dozen specimens from various localities in Burma and Siam. All in good coat differ from the type of *fulvidina* by being noticeably greyer in general hue, without its rich ochreous tint, and all, with one exception, in having the backs of the ears bright and contrasted with the head and neck. But scarcely any two of the skins are exactly alike in the colour either of the ears or body, differing noticeably in the extent to which the buff of the contour hairs is bleached to greyish white. The coat, too, varies seasonally, the contour hairs and crests in August and October being about 25 and 45 mm. respectively, and in November and December from about 35 to 50 mm., or a little over, as in the type of *fulvidina*.

Three out of four skins from Toungoo (J. M. D. Mackenzie), August and October, have short, good coats, varying from clearer to buffier grey above,

from buff to whitish buff below, with the pattern on the legs and belly obsolete or weak; but the fourth (32.2.1.73), September, is moulting and entirely lacks the conspicuous greyness of the flanks, which are pale brown, and the ochreous hue of the spinal area, which is darker brown; the ears are much duller and have more black at the base and tips; the coat is shorter, the contour hairs of the flanks, which are hardly longer than the wool, being only 17 mm., those of the crest about 25 mm., and both only very finely speckled; the pattern is strong on the limbs and lower side, although the skin is mature. Skins from Lower Chindwin, the Chin Hills and Mount Popa generally resemble the first three from Toungoo, the younger of the two from Mount Popa having the pattern more conspicuous everywhere than the older. A skin from Koh Lak, in Siam (Malcolm Smith), closely resembles in general colour those from Burma, but has the ears much duller, more uniformly tinted, and less contrasted with the head, as in the type of *fulvidina*.

Measurements and Weights

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*	*Ear*	*Weight*
			in.	in.	in.	in.	lb.
♂ ad.	Toungoo . . .	32.2.1.53	26 1/5	10 3/5	6 2/5	2 4/5	—
♂ ad.	,, . . .	32.2.1.73	23 3/5	10	5 3/5	2 4/5	—
♂ yg. ad.	[1]Mount Popa . .	14.7.19.86	29 2/5	10 4/5	6 1/5	3	13
♂ yg. ad.	,, ,, . .	32.2.1.55	23 4/5	11 3/5	5 4/5	2 4/5	8
♀ ad.	Toungoo . . .	37.3.24.17	23 1/5	10 4/5	5 4/5	2 3/5	—
♀ ad. ?	,, . . .	32.2.1.54	20	11 1/5	5 4/5	2 4/5	—

Skull.[2]—The only skulls available for examination are the few belonging to the Burmese and Siamese skins above referred to. Neither in size nor in other characters does there seem to be any difference between them and the skulls of the Himalayan race *affinis*, but the average length of pm^4 in four ♂

[1]The length of the head and body in this skin is entered as 735 mm.; but this, I expect, is an error for 635, which would make that dimension 25 2/5 inches. At all events the skull of this specimen is 6 mm. shorter than the skull of the specimen from Toungoo (No. 32.2.1.53) in which the head and body are 26 1/5 inches, 3 inches shorter than the measurement entered for the Mount Popa skin, which, according to the entry, rivalled in size the largest skins of the western races *chaus*, *furax*, and *nilotica*.

[2] The skull of the type is unknown. According to Thomas the skull bearing the same collector's number as the skin of the type belonged to a Leopard-Cat (*Prionailurus bengalensis*). I have been unable to verify this determination because the skull has disappeared. But the differences in size and other characters between the skulls of the two species are so manifest that it is impossible to suppose Thomas was mistaken; and the measurements he gave of the skull, namely, total length 93 mm., condylobasal length 82·5 mm., and zygomatic width 66 mm., agree with adult examples of *P. bengalensis*, but are much too small for adult examples of *F. chaus*. There are no flesh measurements of the type skin of *fulvidina*, but, as made up, it is as large as adult examples of Indian and Burmese specimens of *F. chaus*. Very unfortunately Thomas added that if the skull in question belonged to the skin, *fulvidina* would have to rank as a distinct species from *F. chaus*. No one acquainted with the skulls of the Felidae could admit that the skin of the type of *fulvidina*, manifestly an example of *F. chaus*, could have carried a skull like that of *P. bengalensis*.

Skull Measurements of Burmese and Siamese Specimens provisionally assigned to *Felis chaus fulvidina*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Mand. length*	pm^4	m_1
♂ ad.	Toungoo	32.2.1.53	120	108	81	33	23	30	—	15	—
♂ yg. ad.	Yin, Lower Chindwin . .	32.2.1.56	115	—	75	36	21	29	77	(13+)	10
♂ yg.	Mount Popa	32.2.1.55	100	91	64	35	15	24	65	13	10
♂ yg. ad.	,, ,, ...	14.7.19.86	114	103	75	35	19	27	75	13	10
♀ ad.	Toungoo	37.3.24.17	114	103	73	33	18	27	75	11·5	9·5
♀ ad.	,, ...	32.2.1.54	110	98	72	34	18	26	72	11·5	9
♀ ad.	Tegyigin, Lower Chindwin .	32.2.1.57	105	95	70	34	18	24	68	12	9
♀ ad.	East Siam	14.8.22.17	100	91	68	33	18	24	66	11	8·5
♀ yg. ad.	Koh Lak, Siam . . .	15.5.10.2	—	—	62	33	17	23	61	12	10

skulls is 13·5 mm., 1 mm. longer than the average in *affinis*. In the adult ♂ from Toungoo (32.2.1.53) this tooth is 15 mm., 2 mm. longer than the longest recorded in *affinis*, and about the same as the average length in the typical western race *Felis chaus chaus*. In the skull from Yin the length of the crown has been estimated from that of the socket of the tooth.

SPECIMENS IN THE COLLECTION

	Toungoo, Lower Burma (J. M. D. Mackenzie)	Bombay Nat. Hist. Soc. [P]		32.2.1.73
2	Mt. Popa, Myingyan, Burma (G. C. Shortridge)	,,	,,	14.7.19.86 32.2.1.55
1	Lenakut, Chin Hills, Burma	,,	,,	32.2.1.78
1	Yin, Lower Chindwin (G. W. Dawson)	,,	,,	32.2.1.56
	Tegyigan, Lower Chindwin (G. W. Dawson)	,,	,,	32.2.1.57
1 ♂, 2	Toungoo, Lower Burma (J. M. D. Mackenzie)	,,	,,	32.2.1.53–54 37.3.24.17
1	Burma	Zoological Society [P]		39.674
	Kob Lak, Siam	Dr. Malcolm Smith [C & P]		15.5.10.2
	East Siam, 13° 45′ N. 99 25′ E.	K. Gairdner [C & P]		14.8.22.17
1	Kampong Tomb, Annam (W. P. Lowe)	J. Delacour [P]		28.7.1.36 (type)

The Burmese and Siamese specimens entered above are of doubtful identity and are merely tentatively referred to *F. fulvida*.

Genus OTOCOLOBUS, Brandt

1842. *Otocolobus*, Brandt, Bull. Acad. Sci. St. Petersb., 9, pp. 37–9, 1841; Severtzow, Rev. Mag. Zool. (2), 10, pp. 286–90, 1858; Pocock, Proc. Zool. Soc., 1907, p. 299, figs.; Birula, Ann. Mus. Zool., St. Petersb., 21, p. 155, 1916; Ognev, Zeitschr. Säugetierk, 5, p. 78, 1930, and Mamm. of U.S.S.R., etc., 3, p. 174, 1935; Pocock, Mamm. Brit. Ind., 1, p. 315, 1939; Heptner and Dementiev, Mammalia., 1, pp. 234–40, 1937 (in part).

1905. *Trichaelurus*,[1] Satunin, Annu. Mus. Zool., Acad., St. Petersb., 9, p. 1; Pocock, Ann. Mag. Nat. Hist. (8), 20, pp. 335 and 349, 1917.

Type and only species of the genus, *Felis manul*, Pallas.

GEOGRAPHICAL DISTRIBUTION.—Central Asia, Mongolia, Kansu, Transcaspia, Afghanistan, Baluchistan, Kashmir, and Tibet.

CHARACTERS.—Distinguished principally from *Felis* in external characters by having the ears shorter, more rounded at the tip, very widely separated and set lower down on the sides of the head, so that, when normally expanded and not depressed, their inner edges scarcely rise above the level of the unusually wide forehead.[2] There are also differences in the pattern, the vertical stripes on the

[1] Satunin, misled by Palmer (*Index Gen. Mamm.*, 1, p. 487, 1904), introduced this name under the impression that *Otocolobus* was preoccupied by Brandt for a ground squirrel (*Citellus*). Brandt in 1844 accidentally substituted *Otocolobus* for *Colobotis*, which he had applied to the rodent in question.

[2] This feature, which imparts a very characteristic aspect to the face of *Otocolobus*, was pointed out in my paper above quoted (1907) and was substantiated by the first published photograph of the living animal. It is not so apparent on dried skins and was ignored or over-

body being restricted, when visible, to the posterior half of the back and loins; there are spots on the head, no stripes on the nape or shoulders, no spinal stripe and the stripes on the tail form thin rings and are widely spaced, with those at the posterior end wider below than above and coalescing so that the under side of the organ is almost wholly black terminally. Under a strong light the pupil of the eye contracts to a minute black spot, not to a vertical slit.

Skull.—The skull in its general form is an exaggeration of that of *Felis*, being broader and higher in relation to its length and, when adult, further differs in the following particulars: the upper edges of the larger orbits are slightly raised, so that the forehead between them is flat mesially, slightly concave laterally and the frontal postorbital processes are more pointed; the inferior edge of the orbit is thin throughout, showing no trace of the thickening adjoining the infraorbital foramen; the nasal branch of the premaxilla is not expanded at its junction with the nasals; there is no posterior sagittal crest on the interparietals and the coronoid process of the mandible is more hooked at the summit, its upper anterior edge being strongly convex and its posterior edge strongly concave above the condyle.

The bulla has the divisional line between its ectotympanic and entotympanic elements better defined superficially than in *Felis*; and, as I pointed out in 1916 (*Ann. Mag. Nat. Hist.* (8), 18, p. 328, fig. 2), it adaptively resembles that of some other species of the Felidae, which frequent open country as opposed to forest or jungle, in being considerably inflated with the outer chamber enlarged and approximately equalling the inner in capacity, the two being separated by a high partition.[1]

The dentition is characterised by the complete suppression of pm^1, which is present, if small and early deciduous, in *Felis*; also the inner lobe of pm^4 is greatly reduced, although in this respect *Otocolobus* adaptively resembles *Felis nigripes*.

Otocolobus manul, Pallas

(Synonymy under subspecies)

Distribution as under the genus.

Characters.—About the size of the medium-sized species of *Felis*. The winter coat is luxuriant, with abundance of wool; but there is no dorsal crest. The general colour of the upper side and tail is very variable, sometimes dominantly silvery grey, rarely darkish grey with no buff, ochreous or rufous tint; but the wool at least is usually suffused with one of those tints which is exposed, especially in the winter coat, in patches when the contour hairs are parted; sometimes the reddish ochreous tint is dominant, but the contour hairs at all events of the back and sides of the body always have extensive whitish ends

looked by Heptner and Dementiev when in 1937 they assigned *F. margarita* to *Otocolobus* on the evidence of some cranial resemblances. The difference between *F. margarita thinobius* and *O. manul* in this feature is very clearly shown by Ognev's plates of the two species which completely confirm my observation.

[1] Since a similar modification of the bulla occurs in such obviously unrelated species as *Uncia uncia*, *Lynchailurus pajeros*, as stated on p. 334 of the above quoted paper, its occurrence in *O. manul* and *F. margarita* cannot be claimed as evidence of affinity between them as Heptner and Dementiev thought. In the expansion of the bulla *F. margarita* surpasses *O. manul*.

which give a silvery or grey cast to the pelage. The backs of the ears are uniformly tinted, with no pale patch, generally matching the crown of the head. The colour of the face in the "grey phase" is broken up, its prevailing tint being grey with some buff below and at the sides of the nose; the eyes are surrounded with greyish white set off by a narrow black line giving a "spectacled" aspect to the face; the buff close to the rhinarium is also set off by a blackish patch, whence arise some black mystacial vibrissae, the rest of these vibrissae being mainly white and rising from blackish lines on the white of the upper lip; on the cheeks are two conspicuous black stripes, set off by greyish white, the upper rising, as in *Felis*, at the outer angle of the eye and the lower below that organ, the two descending obliquely and fusing with the sooty brown area, with white-tipped contour hairs, on the hind throat and chest.

The distinctive features of the pattern, often obscure in the winter coat, were described above under the diagnosis of the genus; but there are, in addition, more or less well-pronounced stripes on the bases of the legs and some black patches near the pads; but the limbs elsewhere are whitish or buffy, the back of the hind leg below the hock being ochreous or buff, never black. In the "red phase" the pattern may be black and conspicuous or red and inconspicuous from matching the hue of the rest of the pelage.

Skull.—The skulls vary considerably in shape. In an adult ♂ from Ladakh (*Mamm. Brit. India*, 1, pp. 316–17, 1939), the skull is comparatively low in relation to its length, the jaws are long as compared with the cranial portion, the upper facial profile seen from the side is not very steeply sloped and the posterior half of the zygomatic arch is shortish and arcuate. In one from Tibet (*Proc. Zool. Soc.*, 1907, pp. 304–5), a younger skull, judging from the incomplete postorbital bar and much more widely spaced temporal ridges, the height is greater in relation to the length, the jaws are shorter; the facial profile much more steeply sloped and the posterior half of the zygomatic arch longer and nearly straight. An immature skull from the Kirghiz Steppes, with complete dentition, differs principally from the last by having the postorbital bar widely incomplete, an age character, and the posterior part of the zygomatic bar arcuate nearly as in the Ladakh skull. A still younger skull, from Yamdok Lake, Tibet, with the second teeth just erupting, is similar to the one from Ladakh in the slope of the facial line and the shape of the zygomatic bar. A skull figured by Ognev, although it has the postorbital bar widely incomplete, appears to be nearly as old as the Ladakh skull, judging from the width of the area between the temporal ridges; in the slope of the upper facial profile and the curvature of the zygomatic bar it seems to be nearly intermediate between the skulls from Ladakh and Tibet, described above, but the upper edge of the orbit is not so elevated as in either. Finally, a young skull figured by Heptner and Dementiev, with very short postorbital processes, has the same facial slope as Ognev's skull, but the posterior half of the zygomatic bar is elongated and nearly straight, as in the Tibetan skull I figured in 1907.

Of the above-described characters, the striking difference in the slope of the upper facial profile, in the curvature of the crown and the shape of the zygomatic arch, so marked in the adult skulls from Ladakh and Tibet described

above, appear to be independent of age; but the explanation of these and other differences must await the examination of the many more skulls than are at present available.

Some cranial characters, which have been used for systematic purposes, are mentioned in the descriptions of the subspecies entered below.

Birula admitted two local races of *O. manul*, namely the more northern typical form *O. manul manul* and a southern Tibetan form *O. manul nigripectus*, distinguishing them, as Satunin had previously done, mainly by the shape of the nasals and of the presphenoid. In this he was followed by Ognev, who added a third erythristic local race, *O. manul ferrugineus*, occurring to the south-west of the area occupied by typical *O. m. manul*, and to the west of that occupied by *O. m. nigripectus*. I provisionally adopt these conclusions, although the cranial characters relied on do not hold good for the skulls I have seen and there is complete overlap in the colour of the skins available for examination. I also follow Ognev in adding *mongolicus* to the synonymy of typical *manul*.

Otocolobus manul manul, Pallas

1776. *Felis manul*, Pallas, Reise, etc., Russ. Reichs, 3, p. 692 (Dschida River, south of Lake Baikal); *id.* Zoogr. Ross. As., 1, p. 20, 1831; Milne-Edwards, Rech. Mamm., p. 225, pl. 31c, 1871.

1841. *Felis* (*Otocolobus*) *manul*, Brandt, Bull. Acad. Sci. St. Petersb., 9, p. 37.

1905. *Trichaelurus manul* and *T. manul mongolicus*, Satunin, Annu. Mus. Zool. Acad. St. Petersb., 9, pp. 2 and 7 (Kjachta).

1916. *Otocolobus manul manul*, Birula, Ann. Mus. Zool., St. Petersb., 21, p. 153, Ognev, Zeitschr. Säugetierk, 5, p. 83, 1930; Pocock, Mamm. Brit. Ind., 1, p. 318, 1939.

Geographical Distribution.—Kansu, Mongolia, Turkestan, the Southern Urals.

Colour.—A skin from the Kirghiz Steppes, referred for geographical reasons to this race, has the coat luxuriant and about 57 mm. long, excluding a number of exceptionally long, scattered contour hairs; the general colour of the upper side is a mixture of whitish, some black and ochreous, the last tint being due to the upper portion of the long wool showing between the white ends of the normal contour hairs, the basal part of the wool on the back being greyish or purplish brown, but paler on the flanks, where the ochreous is also rather paler than dorsally; the fore part of the back has the ochreous more in evidence than the hind part, which is blacker; the under-hair of the head is brownish black, showing as dusky patches between the white tips of the contour hairs, the upper lip, chin and fore throat are white, and there are no black mystacial lines on the upper lip; the two cheek-stripes are blackish; the chest is pale purplish brown, extensively overcast with white, the rest of the under side being whitish; the stripes on the back are indistinct, merely showing as blackish patches; there are about six stripes on the tail, rather faint dorsally, and the wool of the tail is greyish without the bright hue of that of the back.

This skin seems to agree tolerably well with one described by Satunin from Ferghana and with one described by Ognev; but it is darker than one from the borders of China and Mongolia figured by Milne-Edwards which, judging from the illustration, is much more uniformly ochreous, with well-defined pattern, and evidently differs a good deal from the type of *mongolicus* from Kjachta, which was racially separated from typical *manul* on account of its darker hue. The variation in colour is evidently considerable.

Skull.—In its skull this race was claimed by the Russian authors to be distinguished by the shape of the nasals, which were said to have their sides straight and gradually convergent from before backwards, and of the presphenoid, which was claimed to be rhombically expanded in front, as shown in Birula's figures, copied by Ognev. But in the skull of the specimen from Kirghiz Steppes, the nasals are wide close to the nares, then narrower and parallel-sided for nearly half their length, the sides only noticeably converging between the frontal processes; and Milne-Edwards described the nasals in his specimen as very narrow in their posterior two-thirds and abruptly expanded in front. Moreover, the presphenoid in the skull from the Kirghiz Steppes is narrower, asymmetrically widened in front, somewhat spear-headed, but emphatically not rhombically expanded.

Specimen in the Collection

Kirghiz Steppes (Brandt)	Purchased	45.4.21.1

Otocolobus manul nigripectus, Hodgson

1842. *Felis nigripectus*, Hodgson, Journ. As. Soc. Bengal., 11, p. 276 (Tibet).
1905. *Trichaelurus nigripectus*, Satunin, Annu. Mus. Zool. Acad., St. Petersb., 9, p. 9.
1907. *Otocolobus manul nigripectus*, Pocock, Proc. Zool. Soc., p. 302; Birula, Ann. Mus. Zool., St. Petersb., 21, p. 133, 1916; Ognev, Zeitschr. Säuget., 5, p. 84, 1930; *id.* Mamm. of U.S.S.R., etc., 3, pp. 179–81, 1935; Pocock, Mamm. Brit. India, 1, p. 319, 1939.

Geographical Distribution.—Tibet and Kashmir.

Characters.—Distinguished, according to Birula, from the typical, more northern race by the winter coat being silvery-grey, with more black in it, the wool paler, the head thickly spotted with black, and the stripes on the back and tail more conspicuous. Also by certain cranial features, accepted by Ognev, which are referred to below.

I am unable to confirm the claim of the Russian authors regarding the validity of this race, but provisionally admit it on the grounds of the likelihood of Tibetan specimens proving distinct at least in the luxuriance of the winter coat.

Colour.—Skins in the British Museum attest great variation in colour, seasonal and otherwise, the extremes being darkish grey with no bright tint in the wool and lighter grey, with the wool extensively ochreous on the upper side, except in the centre of the back, where it is mainly deep brown or blackish with at most a trace of the brighter tint at its summit.

A perfect skin from Yamdok Lake has the coat (September 28), about 40 mm. long and not thickly woolly. The dominant colour of the back is silvery-grey, a mixture of black and white speckling, the comparatively sleek, white-ended contour hairs mostly concealing the underlying ochreous wool which, however, is more manifest on the flanks than on the back; on the back the wool is purplish brown at the base, but this tint gradually fades to pale grey on the flanks, the brighter tint of the wool is also paler on the flanks and disappears on the under side, which is mainly white, except for the sooty grey hue of the chest; the head is darker grey than the nape and shoulders and has numerous black spots; the muzzle is rusty and the chin and throat white; on the hind back there are about five black stripes, one, as usual, being more pronounced than the rest; the tail is paler than the back, its wool being creamy and less concealed by the white ends of the contour hairs, and it has eight, mostly conspicuous, black stripes as well as a black tip. This skin seems to resemble very closely the one I described in 1907, which is not available for re-examination.

Very different in general appearance, owing to the development of the coat, is a skin from Ladakh. The winter coat is about 50 mm. long, excluding a number of large scattered contour hairs, and its wool is exceedingly thick, with the result that it pushes apart the white-ended, normal contour hairs so that its ochreous hue is everywhere displayed, giving a much yellower aspect to the pelage than in the autumn skin from Yamdok Lake, with its silvery contour hairs mostly concealing the wool; the pattern on the head, hind back and tail is also much less pronounced. There is no reason to doubt that the difference in colour and pattern between these two skins is purely seasonal. The one from Ladakh very closely resembles the winter skin assigned to *O. manul manul* from the Kirghiz Steppes, and differs considerably from the skin of *O. manul nigripectus*, from Kam in East Tibet, figured by Birula (*loc. cit.*, pl. 7, fig. 3), and alleged to be in winter coat. This skin, which formed the basis of his conception of the pattern and colour of *O. manul nigripectus* in winter, very closely matches the autumn skin from Yamdok Lake in the distinctness of its pattern, and apparently in the texture and colour of its coat. The suggestion that it was an early winter skin may explain its profound difference from the skin from Ladakh, probably in late winter coat.

There are two native Tibetan skins in Hodgson's collection. One is very like the skin from Yamdok Lake, having the coat about 35 mm. and only moderately woolly, but the wool is rather paler. The other, only about half-grown, differs from all the previously described skins of the species in having the wool grey without any buff or ochreous tint.

Skull.—According to the Russian authors the lateral edges of the nasals in *nigripectus* are mesially constricted in front of the points of the frontal bones, the area between these bones being comparatively broad, with convex edges and a rounded posterior end, thus differing markedly from the nasals, claimed to be characteristic of typical *manul* with their straightish, evenly convergent sides ending in a narrow point at their posterior ends. But in the skulls of *nigripectus* from Ladakh and the Yamdok Lake, the nasals are not as described

and figured by Birula for this race. They are much less noticeably constricted and the interfrontal portion is not so wide, its sides being straightish and its point narrower, especially in the Ladakh skull. The bones are not quite alike in the two skulls, but in neither case do they differ in any important respects from those of the skull of typical *manul* from the Kirghiz Steppes.

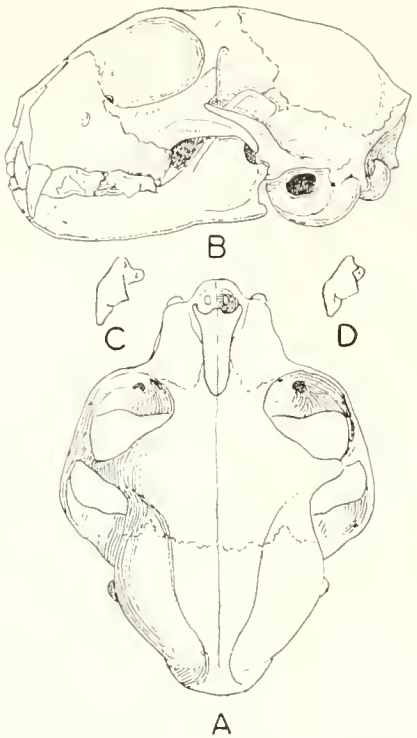

Fig. 9.

Otocolobus manul nigripectus, Ladakh.
A.—Upper view of skull. *B*.—Side view of skull.
C.—Pm.^{1}. *D*.—Pm.^{4}, *Felis constantia ornata*.

The differences claimed to exist in the shape of the presphenoid between typical *manul* and *nigripectus* similarly fail in the skull in the British Museum. In the young skull of *nigripectus* from the Yamdok Lake the exposed part of the bone is sagittiform or "spear-headed" in shape, very much as in Birula's photograph of the adult ♂ skull of typical *manul* from Semipalatinsk (*loc. cit.*, pl. 8, fig. 4), although a little narrower, and differing from the much narrower

presphenoid, with its very small process on the left side of Birula's ♂ skull of *nigripectus* (*loc. cit.*, pl. 8, fig. 5). In the skull of *nigripectus* from Ladakh the bone differs from all the preceding. It is wider than in the skull from Yamdok Lake, asymmetrically expanded, with two angular projections on the left side, and one larger angular projection behind and a smaller rounded projection in front on the right side. In none of the skulls of *O. manul* that I have seen is the presphenoid "narrow and lineate" or "wide and rhombic", as depicted in Birula's drawings of this bone in his specimens of *nigripectus* and typical *manul* respectively.

Specimens in the Collection

♂?, 1 mtd.	Tibet	B. H. Hodgson [P]	58.6.24.112 45.1.8.209
♂	Yamdok Lake, Tibet, 15,000 ft. (Major Iggulden)	Col. L. A. Waddell [P]	5.4.5.1
1	Ladakh, Kashmir (Sir R. Strachey)	Secretary of State for India	79.11.21.540

Otocolobus manul ferrugineus, Ognev

1889. *Felis manul*, Radde and Walter, Zool. Jahrb., 4, p. 1013 (Askhabad).
1928. *Otocolobus manul ferrugineus*, Ognev, C.R. Acad. Sci., U.S.S.R., p. 308; *id.* Zeitschr. Säugetierk, 5, p. 84, 1930; *id.* Mamm. of U.S.S.R., etc., 3, p. 186, 1935; Pocock, Mamm. Brit. India, 1, p. 319, 1939.

Geographical Distribution.—Transcaspia, Kopet Dagh, North Persia, Afghanistan and Baluchistan.

Characters.—Intergrading with typical *O. manul*, but distinguished by the dominance of red all over the upper side, and especially on the dorsal area where the wool is rich rusty ochreous to the base, although the distal ends of the contour hairs are silvery, giving a grey cast to the pelage. The pattern may be visible and black or inconspicuous and red.

Skins vary individually in grades of erythrism. One from the Toba Plateau, Afghanistan (26.3.5.1), has the wool on the flanks ashy grey, the chin and throat white, the chest ashy grey and the rest of the under side white; the legs are fawn, with the area from the heel downwards rusty; the pattern is represented by scattered black spots on the head, black stripes on the cheeks, faint traces on the hind back and proximal half of the tail, but stronger on its distal half above, well developed below and confluent with the conspicuous black tip. A skin from Meshed, Persia (13.6.10.1), is much more rufescent, the under hair of the flanks being richer, darker ochreous, and there is no black anywhere in the pelage, the spots on the head, stripes on the cheek and on the end of the tail being rufous, and the whole of the under side is tinted, the chin, belly and groins with pale buff, the chest with richer ochreous. A third, headless skin (35.8.26.1), without locality, tolerably closely resembles the one from the Toba Plateau, but has the pattern more prominent.

SKULL MEASUREMENTS OF *OTOCOLOBUS MANUL*

Sex	*Locality*	*Number*	*Total length*	*Cond. bas. length*	*Zygom. width*	*Cranial width*	*Postorb. width*	*Int. orb. width*	*Max. width*	*Bullæ*	pm^4	m_1
	O. m. manul											
♂ ad.	Asiatic Russia . .	(*vide* Ognev)	88·6	83	69 ·	43·8	38·5	20	24	22·3 : 16·3	11·2	9·9
♂ ad.	,, ,, . .	,,	87·2	82·3	66·9	48·6	37 ·	20	24 ·	22 : 18	11·1	9·8
? ♂ ad.	Transcaspia . .	(*vide* Satunin)	92	—	74	48	36	19	25·2	—	11	
? ♀ ad.	,, . .	,,	84	—	66	46	37	18	22	—	9	
? ♂ yg.	Kirghiz Steppes . .	45.4.21.1	—	76	62	47	37	18	22	20·5 : 17	11	10
	O. m. nigripectus											
♂ ad.	Ladakh . . .	79.11.21.540	93	85	71·5	48	39	19 ·	26	22 : 17	12	9
? ♂ ♀ yg.	Tibet . . .	(Zool. Soc.)	85	75	69	47	41	19	23	—	10	8·5
♂ yg.	Yamdok Lake . .	5.4.5.1	—	(70 ·)	57	45	39	16	20	18 : 15	11	9
♂ ad.	Tibet . . .	(*vide* Ognev)	88	81·6	66 +	46·3	36·8	18 ·	24·3	20·9 : 16·2	11·3	10·5
ad	Kham, South-west Tibet	(*vide* Satunin)	88	—	67	48	37	19	—	—	11	
	O. m. ferrugineus											
♂ ad.	Askhabad . . .	(*vide* Ognev)	89	83	67 ·	48	38·6	19·3	23 ·	22 : 16	11·3	10·5

Measurements

Sex	*Locality*	*Number*	*Head and Body*	*Tail*	*Hind Foot*
♂ ?	Toba Plateau, Afghan-Baluchi Border	26.3.5.1	in. 25	in. 12	in. —
♀	Meshed	13.6.10.1	25·5	12	4·5
?	?	35.8.26.1	25 ±	11·5	—

Skull.—According to Ognev the skull resembles that of the typical form.

Specimens in the Collection

♀	Meshed	Sir P. R. Sykes [C & P]	13.6.10.1
1	Toba Plateau, Afghan-Baluchi Border	Col. J. N. Wilson [P]	26.3.5.1
1	?	Messrs. P. R. Poland & Son [P]	35.8.26.1

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